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MAXIMUM POWER COMPUTING

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DOOM 3, E3 & 3D

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MP3 UNDER ATTACK Audio compression crushers

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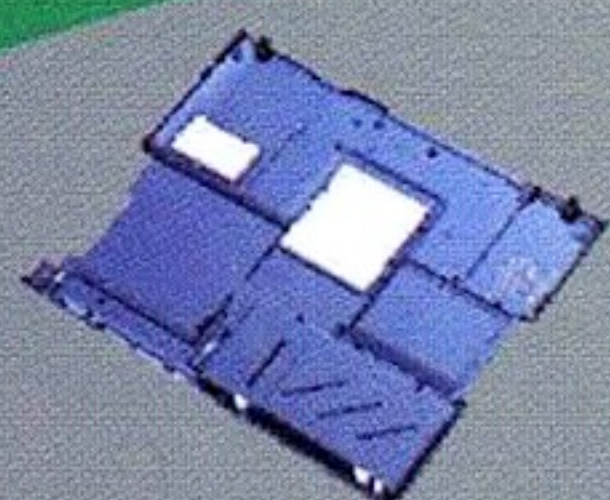
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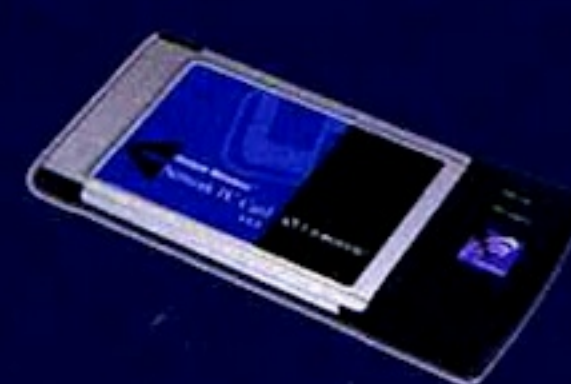
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X-RAY: THE GUTS OF THE GAMECUBE

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Resident psychopath Dan Rutter must have a thing against consoles. Why else would he enjoy ripping the guts out of innocent game boxes to see what makes them tick?

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Digital music is the way of the future. But with so many competing formats, which provides the best balance of size and audio quality?

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While NVIDIA and ATI are busy duking it out in a dingy alley for the title of best kid on the 3D block, Matrox has been busy in its study, relaxing in its smoking jacket and slippers and planning Parhelia-512, the 3D choice for the discerning gamer.

TUTORIAL: THE HEAVY WATER PROJECT PHASE 2

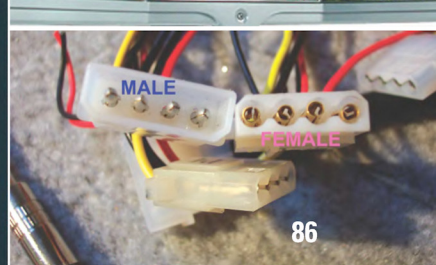
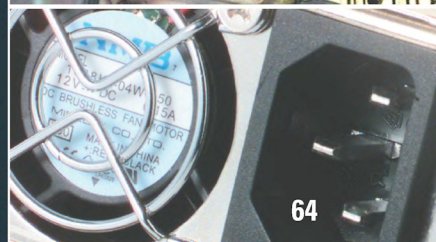
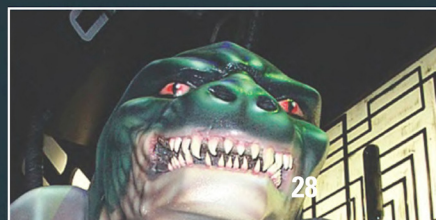
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Last month was only the beginning, in the latest installment of our four part, mother of all case modding tutorials we tackle the two Dubya's – Windows and Wiring, both essential steps on the road to case mod Nirvana.

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Somehow we pulled a Max Payne, slowing down time so we could jam the next year's worth of games into three very short days. And what a year we have to look forward to, loaded with the good kind of Doom and gloom.

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We came, we saw, we drank. We also talked trash and tech. And the next day we drained Sydney's Berocca supply.

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Heralding a new era of strangeness in computer presentation. Now with added Democracy and some seriously cool prizes.

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It's time once again to jump on the Atomic soapbox, to vent your anger, share your angst, or just try to be funny. This is your shot at stardom, don't miss out.

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Atomic. Your Letterbox. Whole year. What more do you want?

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What do you want to win? CPU? Car MP3 Player? Fanbus? Game? Well it's all here, and up for grabs.

3D sunrise



There are shenanigans afoot in the graphics card scene and we love it. Finally we've got something new and exciting to get crazy about. We're getting a little tired of the incremental hardware features that NVIDIA hands out and we're ready for something funky. While the per-pixel shading the GF4 delivers does, without doubt, make the water in Tomorrow look very watery indeed, there's stuff all else that even vaguely justifies the \$500 - \$800 you'll pay for it. Never mind that, being an Atomecan, it may have only been 6-12 months since you last forked out that kind of cash for a GeForce3. I'm getting a little weary of paying my \$1,000 annual subscription to NVIDIA, for what, ultimately, only equates to a faster card.

Faster has always been what a new card is supposed to be about, but that's almost never the marketing line NVIDIA takes. Instead it's the new technology, and rightly so. But most game developers don't bother supporting these minor steps forward. A Microsoft developer recently told me that Microsoft simply doesn't bother implementing any hardware features, over and above what's regulation DirectX 8.1, as the development time invested serves only a tiny percentage of the gaming community. In contrast, and rather dismally, after this year's E3 we're left a little depressed after seeing Xbox titles looking quite superior to their PC equivalents. Developers love that every single Xbox can do per-pixel, vertex shading and anti-aliasing that can be tuned prior to a game's final shipping. This known quantity is the Xbox's greatest strength — it's also the PC's greatest weakness in the mass-market economy.

PC gaming has always been about maximum sophistication and complexity. What's needed now is something that makes the idea of implementing advanced video features into a more appealing prospect for developers. We need them to get excited again, to feel that the PC truly is the high-ground. The capabilities of DX 8/GF4 are known and predictably impressive, and we'll be seeing these pushed to the limit with Xbox titles over the next few years, but during that time

PC gaming technology must move to the next level. Implementation for developers, and primarily artists, must become technically easier. And the end results must be far superior to what we know the Xbox is capable of already.

The edge PC gaming has always had must be maintained. Ironically, it is Microsoft that will play a key role in this. DirectX 9 is likely to be truly revolutionary. It promises unlimited creative freedom for designers and artists. Yes, we've heard that before, but it's just been too many years since volumetric lighting was the most amazing thing ever, and it's still one of the old-reliable effects that is supposed to showcase PC gaming as bleeding edge.

Of course, we'll all have to buy DX 9-compatible cards, sometime in the next year or so. Cool. I want something really new for once. The first chipset that's been exposed is Matrox's Parhelia. As our feature story shows, the capabilities are an evolutionary leap ahead of the flat-shaded polys we've been getting slowly bored with over the years. Parhelia is a confidence-inspiring boost for PC gaming. It's also a welcome return to the spotlight for our old friend Matrox. Parhelia integrates a staggering 80 million transistors onto its core — that's more than twice as many as AMD needs to build an Athlon XP. It's clear that Matrox is both serious and capable. Also feeding our excitement about Parhelia is that it's not merely capable of producing graphics that truly leave you gasping — it's also hell fast. The 512-bit internal bus, hardware LOD and 16x fragment anti-aliasing mean that we're not, for once, being teased with graphical capabilities which, in the real world, will need to be turned down, or off, in order to achieve playable performance.

And what of NVIDIA? Bennett visited the NVIDIA stand at E3 and asked how the company was planning on dealing with the threat Parhelia poses. With an arrogance Bennett found quite distasteful, the NVIDIA marketing chap laughed it off, but offered no details other than 'We have nothing to worry about'. That could mean an imminent GeForce 5 with an all new feature or two added to a legacy core that dates back almost five years, or, if NVIDIA wants to stay in our good books, something very new and special could be just around the corner.

Let's hope so, because we can't let Matrox do the hard work of keeping the PC on top, where it belongs.

Ben Mansill

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MAXIMUM POWER COMPUTING

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Printed by AIW Printing. Distributed by:

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Short Circuits

Uh-oh. We made a boo-boo in last month's Atomic. On page 57 we reviewed the mStation Car Jukebox, and you'll see a score of 8.5. Woops. This should actually be a massive 9.5, with an accompanying Hot Award. Massive apologies are due to the supplier, Kaz Electronics (www.kazelectronics.com.au) for this oversight.



It seems not a month goes by that we don't run at least a small piece on Google's latest innovations. Surprise, surprise, Issue 18 is no different.

Google's latest invention is actually a set of inventions. Called Google Labs, the new feature provides a place where Google engineers can show off their pet projects, allowing them to be evaluated and beta tested by the public.

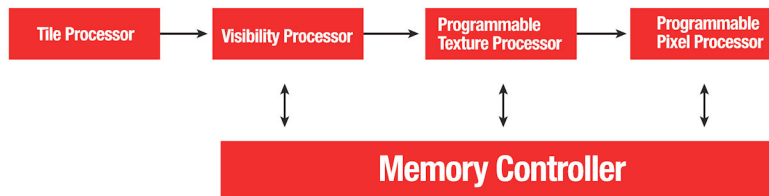
Policy at Google dictates that employees only work upon pet projects in their spare time. However, due to the sheer number of projects under development, Google turned to the public to decide which were most worthy.

Not only does this provide us with brand new toys to play with, it also allows Google engineers to improve their projects for potential front page deployment.

Counter-Strike will be coming to the console world in the near future when Microsoft launches its 'Xbox Live' online gaming service.

Valve Software, in conjunction with Gearbox, have plans to port Counter-Strike to Xbox for use on the new network. Included in said port will be certain content unavailable for Counter-Strike on the PC. Darn.

Graphics dry spell comes to an end



May 2002 marks the end of the duopoly controlled by ATI and NVIDIA. 3DLabs and Matrox are officially entering the fray with their P10 and Parhelia respectively, both aimed at the high-end graphics market. Both the P10 and Parhelia will be fully DirectX 8 and partially DirectX 9 compliant.

On 16 May 2002, Creative completed its acquisition of 3DLabs and announced a product based on the P10 is slated for release before Christmas this year. 3DLabs, founded in the same year as 3dfx and NVIDIA, has been mainly involved in designing high-end workstation graphics processors. The P10 VPU (Visual Processing Unit) will be the first product from 3DLabs to target the converging workstation and consumer 3D market.

Current DirectX 8 hardware is programmable up to the vertex level. From there, the fixed function pipeline takes over and things are done in hardwired fashion. Even pixel shaders are not fully programmable as they are effectively register combiners. Features such as anti-aliasing are fully hardwired and allow little or no developer intervention. 3DLab's P10 processor will be fully programmable throughout the entire pipeline. This will allow developers to manipulate vertex and pixel data with the same amount of flexibility as CPUs offer, but at much greater speeds.

The significance of this is

great for real time, film quality gaming. Movies like *Shrek* are rendered using farms of CPUs rather than graphics hardware, as the custom effects cannot be easily accelerated using the hardwired effects from today's graphics processors. In order to have photorealistic graphics in our games, graphics processors must have the same flexibility as CPUs. The reason that we have division over DirectX versions and OpenGL extensions is that ATI and NVIDIA are using different approaches to programmable functions in the pixel pipeline. By having a SIMD array such as a CPU to handle all vertex and pixel functions, the P10 will offer true programmability surpassing the limitations of current APIs (Application Programming Interface).

The P10 uses a 256-bit DDR memory interface, giving it the same potential bandwidth as Parhelia, at around 20GB/s. Built with 0.15-micron technology and packing 76 million transistors, the P10 will most likely be clocked at just under 300MHz. Its four immensely programmable pixel pipelines will offer texture loop back, allowing eight textures to be applied in a single pass. The P10 also includes 3DLab's highly respected Virtual Memory scheme, something id Software's John Carmack has also moaned repeatedly about. In simple terms, it

mirrors the action of the L2 cache for the CPU but in this case, the L2 cache is the onboard video memory and the CPU is the graphics processor. This is a significant improvement in memory management and if utilised, will give developers virtually unlimited freedom in texture usage. The P10 features 16 floating point scalar processors to form its vertex shader. This is not directly comparable to the twin vertex shaders found on the GeForce4, which are vector processors. The advantages of having smaller but numerous scalar units are greater flexibility and parallelism. This approach effectively combines the flexibility of a CPU to the parallel nature of a GPU, which is just what's needed if photorealistic games are to become a reality.

Information on the P10 is still scarce but it is already very clear that it is an extremely forward looking architecture. 3DLabs is the primary promoter of the OpenGL2.0 standard (comparable to DirectX 9) and the P10 is already running a prototype version of GL2. What is unclear is whether the P10's architecture is *too* early. While programmability is the way of the future, hardwired solutions will always be faster in current games. Until pixel and vertex shaders become commonly used in games, it is likely that the P10 (similarly with Parhelia) will be outgunned in today's benchmarks. ○

Napster survives. Again

Up and down. Back and forth. Napster's dead. No it's not. Napster's fee based. Napster's dead again.

Damn Napster.

Reading up on the history of this ill-fated file sharing application, written way back in 1999 by a naive US college student called Shawn Fanning who thought the phrase 'information wants to be free' could break all barriers and turn the world into one big music lover's Utopia, is somewhat like watching a yo-yo. While Napster executives catfight among themselves over division of monies – monies which Napster doesn't actually possess – and major record labels tighten their iron grip on the besieged company via mountains of paperwork and an endless supply of slick-suited lawyers, the majority of Napster's 80 million heyday users have moved on to the holy grail of file sharing: decentralised peer to peer.

We're all used to the ongoing saga that is Napster. However, when you add latest developments to the mix, Napster's story reads like something straight out of a low budget midday soap.

A few months after Napster becomes wildly popular, recording companies across the globe collectively soil their trousers at the thought of being sent broke by a few thousand lines of computer code. Lawsuits fly as companies including Sony, BMG and – get this – a meditation music company, vie for first crack at crushing the upstart music service. Meanwhile, Germany's Bertelsmann AG, parent company of BMG, offers to step in with a 'strategic partnership', saving Napster from one or two suits while giving it the legitimacy and a serious chance at the 'licensed content' it so desperately needs. In return, Napster will turn to a 'subscription based' system.

Move forward about two years. Bertelsmann's latest buyout offer has been refused because certain Napster executives are too stubborn to agree on how the profits will be split. Several founding members, including Napster author Shawn Fanning, quit in disgust. Things are looking grim for the company and yet, at the last moment, Napster pulls it off again. Bertelsmann's offer of \$US8 million (AU\$14.6 million) and 'all debts paid' is accepted, despite the fact that an offer earlier in the same week of \$US16 million was rejected. Shawn and co. return to their original positions within the company, and it continues to look for a way to bring us a service that both appeases the major record companies, and yet retains some small semblance of usefulness to music lovers.

Tens of millions wasted. Over one hundred people laid off. Thousands of lawyers gloating over fat legal fees. All this, and yet no-one has stopped to ask the question: 'Is there anyone left that cares?' It's becoming increasingly obvious that a service offering everything music lovers actually want at a fair price, while still involving any form of record company, is nigh on impossible. Music lovers don't want to be told they must install Windows Media Player, only download twenty songs a month, not listen to any of them on a device other than the computer they were downloaded to, and then be charged through the nose for the privilege. On the other hand, recording companies don't want to be involved in the online distribution scene at all. The sole reason they're making an attempt is because they realise that either they do it (and sue any kind of competition out of existence), or someone else will.

What they all fail to

realise, however, is that the Napster brand itself is effectively dead. People have had enough. They're still willing to pay good money for good content, but they most likely won't do it through any service using the Napster name. Right now, there are several P2P file-sharing applications doing the rounds. The same 80 million or so users that Napster bragged about at the height of its popularity make up a good percentage of the users currently infatuated with P2P. These P2P apps are free and, while they contribute to music piracy, there is no viable alternative in the eyes of most users. Add to this the revelation that artists are being paid a pittance for contribution to the 'official' online services such as PressPlay, and it becomes bleedingly obvious that the only obstacles in the way of providing a decent service are the record labels themselves.

However, there's hope for the labels yet. Vivendi Universal has taken the major step of making a song available for purchase, online, in MP3 format.

The file, which seems to lack any form of Digital Rights Management, is a dance remix of Meshell Ndegeocello's 'Earth' track. Currently, the song is available for US\$99c (AU\$1.77).

While this is definitely a step in the right direction, many are speculating Vivendi could be using the trial as a method of proving that online digital distribution does not work. If the file fails to sell, or if it suddenly appears across all the major P2P networks, the record labels will have a major piece of propaganda to take to US Congress regarding levels of online piracy. More importantly, Vivendi can use it as a direct example of why the world 'needs' legislation such as the CBDTPA (formerly SSSCA). ○

Short Circuits

Audio CD copy protection is a boom industry right now. Sony, Macrovision and others have vast armies of programmers (well, one or two at least) slaving away in some dark corner of the universe with the sole intent of taking away everyone's right to listen to legally purchased music as and where they choose to. Sony's latest effort, a method it calls Key2Audio, seems to do this reasonably well. Not only can you not copy any Key2Audio protected music CD (which technically isn't an Audio CD at all), it's impossible to even play the things in any computer CD-ROM drive.

At least, that used to be the case – until someone got inventive with a 99c 'magic marker' pen. By marking Key2Audio protected CDs at certain places with a 'magic marker' pen, you can totally bypass the protection scheme which will allow you to both play and copy the CD to your heart's content.

Naturally, we're not advocating piracy. Music piracy, like computer game piracy, is a bad practice that ultimately takes money away from the people who put in hard work to give you the songs and games you love. However, we're delighted that through the use of nothing more complicated than a cheap permanent marker, music lovers once again have the freedom to rip their own CDs to MP3 and listen to them where, when and how they choose.

Ferraro Design, maker of the Claw peripheral for PC gamers, has developed a prototype device that allows a standard USB mouse and the Claw to be used for Xbox. The combination will allow FPS fans to play games with standard mouse/look, while using the Claw to handle Xbox controller input. A release date is yet to be announced.

Short Circuits

When the ground in Taiwan shakes, so do hardware prices. That is the peril of having a large chunk of the world's hardware industry based in an earthquake prone area. But the latest crisis threatening hi-tech in Taiwan comes not from below but from above, with a lack of rain leading to severe drought throughout the island. To put the need for water in perspective, some of the printed circuit board manufacturers use up to 8000 tonnes of water per day. The situation is so bad in some parts of the country that, for the first time, Taiwan has to import water from Mainland China. Recent heavy rains have unfortunately been confined to the south of the country, while the major technical centres of Hsin-Chu and Taipei have remained dry. The good news is, that for the short term at least, this shouldn't affect the availability or pricing of hardware. However, if the drought continues this could be one of the biggest crisis' to affect the industry to date.

Researchers working at the National Taiwan University claim to have invented an optical disc format that is capable of storing roughly 100GB of data, yet still retains compatibility with existing CD-ROM and DVD drives. These semi-transparent discs use 'near-field' optical technology to achieve their high data storage rates. This 'near-field' tech allows a standard red laser, to create marks smaller than the inherent diffraction limit of the laser. The best part about this technology is that little or no hardware changes are required in order to write to the new discs. A 'chipset update' to enable drives to make the smaller marks may be required in some cases, however it is also possible to use the discs without any hardware modification at all.

Optus caps the tap

Sat	Sun	Mon	Tue	Wes	Thur	Fri
1 PRON	2 LATEST EXHIBIT CD	3 PRON	4 AOTC DMX #1	5 AOTC DMX #2	6 PRON	7 TGA ISO
8 PRON	9 PRON	10 PRON	11 PRON	12 PRON	13 LATEST KORNI CD	14 PRON
15 THROTTLED TO 28.8K	16 Depression...	17 ...Anger...	18 Resignation...	19 Check Email Fantasying 1 of 30	20 Downloading 2 of 30	21 Downloading 3 of 30
22 THROTTLED TO 28.8K	23 Downloading 4 of 30	24 Downloading 5 of 30	25 Downloading 6 of 30	26 Downloading 7 of 30	27 Downloading 8 of 30	28 Downloading 9 of 30
29 Downloading 10 of 30	30 Downloading 11 of 30	31 Downloading 12 of 30				

Australia's broadband situation went from bad to dismal with Optus announcing the end of its NetStats traffic monitoring system in favour of tiered pricing plans and 'soft' download limits.

From 1 July 2002, every new Optus cable customer has a choice between four plans: the Lite plan, at \$54.95 for 550MB of data per month; the Standard plan, at \$69.95 for 3GB of data per month; the Pro plan, at \$134.95 for 5GB of data per month; and the Ultimate plan, at \$265.95 for 10GB of data per month.

Once customers hit the download limit of their plan, their bandwidth will be throttled to between 20 and 28.8kb/s for the remainder of the billing period. Thankfully, upstream data is not counted towards usage allowances.

It's worth noting that Optus has adopted the stance of '1,000MB equals 1GB'. As every high school kid by now knows, 1GB = 1024MB. Thus, we must conclude that either someone at Optus skipped a high school 'intro to computers' class or two, or the company is using the same marketing tripe dished out by hard drive manufacturers as a justification for artificially lowering the amount of traffic allowed on each plan.

For those who currently hold Optus cable contracts, the news isn't all bad. The company has chosen to honour existing contracts by keeping you on the NetStats system until the end of your contract, after which time you will be migrated to the new plans.

To ensure NetStat averages aren't adversely affected by users migrating away from the NetStats system, Optus will fix the average download to 80MB per day. This is close enough to the current daily average that most users can continue their normal usage patterns for the remainder of their contracts. ☐

WHAT'S HOT

- THREE MONITORS – gaming goes widescreen
- VIA P4X333 – fastest DDR for the P4
- NORTHWOOD – die shrink with attitude
- E3 – gaming gets good again
- INTERNET CAPS – Less bandwidth for ya buck

Atomican

We came, we saw, we m337ed. Saturday 18 May saw the second gathering of Atomicans, at the annual Atomic m337. AM v2.0 was held at the Cheers Bar (which was great, apart from the ridiculously low ceiling level, as myself, Flouncy, and _Haunt_ can testify to).

Like a group of mongooses, we indulged in many amber and green liquids of the alcomoholic variety, played much pool (trying not to sink the white when shooting on black), cowered at the intimidating presence of the 500kg Tongan bouncer, showed off our über-skillz at Sega Rally, conversed on a wide variety of subjects, ranging from DirectX 9, to how much of a badass Yoda is, and the wandering hands of a certain forumer (who causes much chaos).

A fantastic time was had by all, so if you missed out, you just have to live with the fact that it'll be another year or so until the next big m337.

Kudos must go to that beefmeister Hulkster, for his Ode to Atomicans

(www.atomicmpc.com.au/forum.asp?cat=ge&top=49578). Through the art of poetry, Hulkster has captured some of the many facets of the existence that we eek out on the forums.

Henceforth, in honour of a fantastic stuff-up, when you stuff up any piece of hardware, either deliberately or through sheer stupidity, you shall be said to have 'pulled a kunzie'. This is named after said kunzie, who turned on the power supply when he didn't have his heatsink on his Athlon XP 1600+.

Atomican salutes you for your contribution to the English language kunzie! Stay tuned for when we reveal the meaning of 'doing a Prophey' or 'cybered a Maddie'.

In forum news, we now have access to an archive of the forums, where all manner of classical postage and threadage can be viewed for all eternity (or until the server crashes once again).

In other very important Atomic news, it is with a large amount of w00ting and happiness, that I can announce that swherdman, long time Atomican and bane to spelling purists everywhere, has finally gained the esteemed level of Immortal.

Congratulations swherdy, and as we always like to say: 'There is only one swherdman'!

WHAT'S NOT

- TWO MONITORS – peripheral peripherals
- INTEL 845E – official but slow
- THOROUGHRED – smaller but no better
- S3 – savagely jumping on the XP bandwagon
- BASEBALL CAPS – the depths of fashion

Designed for eXtreme Performance

10:33 Burned
non-Overheating protection



ASUS C.O.P.
(CPU Overheating Protection)
ASUS C.O.P. (CPU Overheating Protection)
is a hardware protection circuit that
automatically shuts down the system power
before temperatures go high enough to
permanently damage your CPU.

Without ASUS C.O.P.
Who's the **NEXT**?

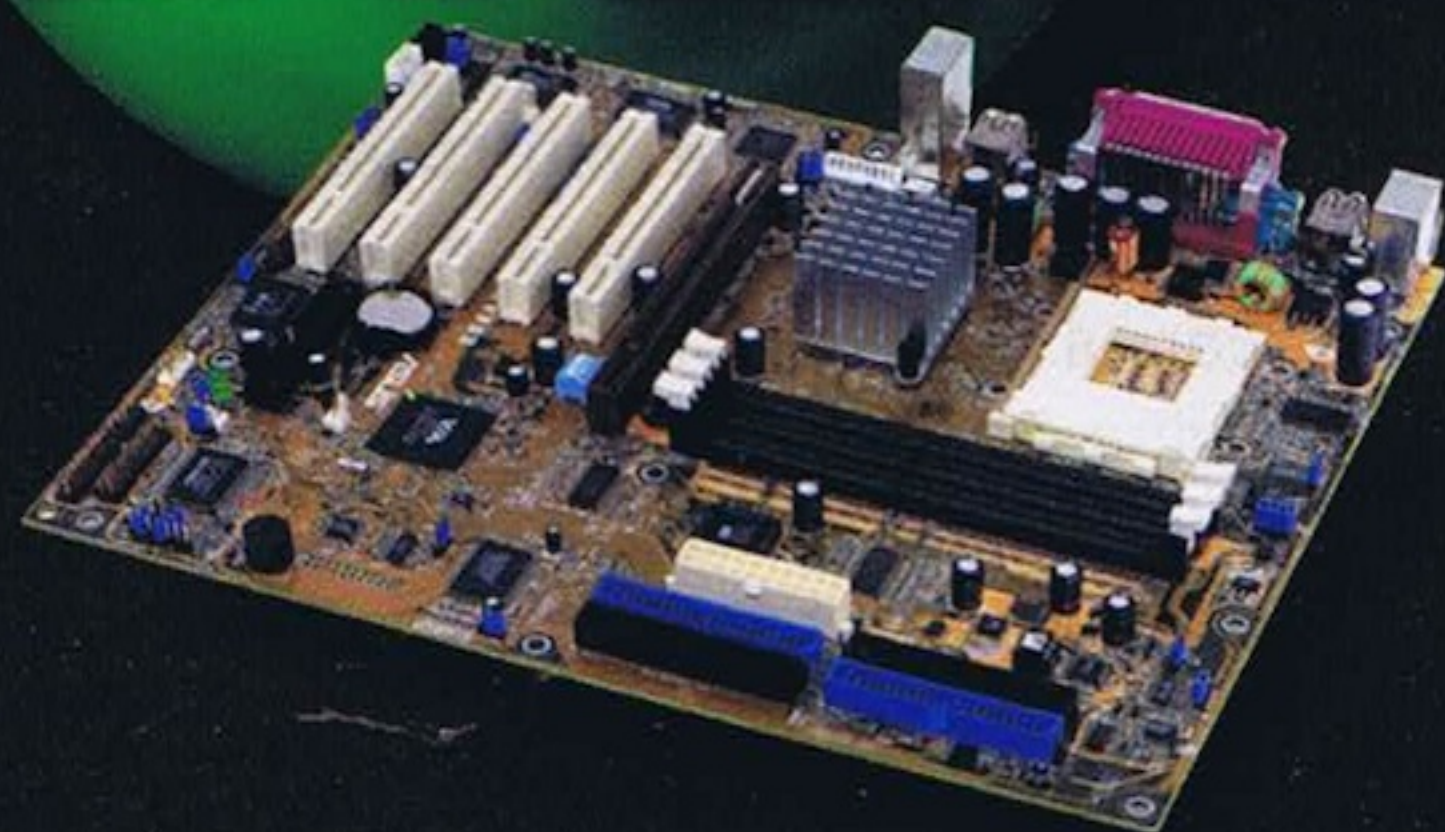
Get the maximum CPU protection with
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Even if your heatsink or CPU fan fails,
ASUS C.O.P.'s hardware protection shuts
down your system, preventing your valuable
processor from going up in smoke.

ASUS C.O.P. Just another innovative feature
from the world's leading motherboard maker.

10:45
CPU Overheating
No Protection!!

09:15 Burned
Overheating

A7V333



A7V333 Specification:

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- VIA KT333 N.B. with 8233A S.B. Supports 266/200MHz FSB
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- 5 x PCI, 1 x AGP Pro
- C-Media 6-Channel Hardware Audio with S/PDIF Support (Optional)
- Promise ATA133 RAID 0, 1 (Optional)
- 4 x ATA133 (RAID ATA133 is optional)
- ASUS CPU Overheating Protection (C.O.P.) Support
- ASUS POST Reporter[®], ASUS MyLogo[®]
- Smart Card/Memory Stick/Secure Digital (Optional)
- 4 x USB2.0, 4 x USB1.1, 1 x IEEE 1394 (Optional)
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Our taste for Spiced Ham

Ashton Mills doesn't need to look twice at messages which begin with 'Enlarge your. . .' and neither should you.



It's been a while since I last ranted, so I'm about due. Last time I waxed nasal at the restriction of certain freedoms and liberties and the long-term effects this will have. For now, there's something else that gets right up my olfactory cavities. . .

Spam. It stinks in all its forms: email, visual and sometimes aural. I call it information pollution, and I'll fight anyone who tells me otherwise, because it's almost always deliberately perpetrated by members of our species with questionable morals. Scum, to use the technical term.

But let's put this into perspective: after language, the Internet is the single greatest communication leap

bandwidth. Would you like to pay the post office every time junk mail is left in your mailbox? But this is exactly what you're doing every time you surf the Web: those junk mail ads are popping on screen courtesy of the bandwidth you're paying for.

The Internet is not, inherently, a push medium like TV and radio. TV and radio force-feed their audiences adverts in and between programs, leaving us with little choice between accepting exposure to ads in order to access the content we really want, or simply switching off. The Web is a pull medium: users go only where they have an interest to go, stay only as long as they choose to, and if a

until its animation is finished – you are forced, like TV, to sit through the whole ad.

Listen up advertisers: the Web is not TV, it does not work like TV, it is a pull medium and no matter what sales pitch you feed your clients to get them to pay for this tripe – this is spam. Intrusive, visual and highly annoying spam. Do not alienate your audience, or you will lose it.

Spam is now colloquial thanks to the over-zealous emailing practices of scum. But it's time to re-define it, for it applies to more than just email. Visual spam now makes up a portion of our everyday Web surfing experience, and it's way too much.

Banner advertising is a great balance: informative without being obtrusive. Popups and popunders are destroying this.


Experienced users have perfected a technique, simply through repetition, to automatically close popups before they have even finish loading. Newbies on the Web aren't able to defend themselves so well, and sadly popups and popunders are on the rise simply because some people are still clicking on them.

Yes, there are people who actually respond to 'ENLARGE YOUR PENIS TO TREE TRUNK SIZE PROPORTIONS FOR JUST \$1!!!' They are, for whatever reason, duped by spam.

Ultimately, the bottom line is that you, and I, and your mum and her friends and the neighbour next door and the funny looking guy at the corner shop – all the people who use the Web – are responsible for this.

If everyone said 'no', it wouldn't be here now.

So I charge you with a task, Atomicans. I urge you to save the information wilderness of our Web-scapes from trash! Don't put up with paying bandwidth for excess advertising. Write complaints to advertisers who spam. Educate everyone you know.

Really, seriously, totally and utterly: the future of the Web and the way it's going to look is up to you. Spread the word (but don't spam it!) 

'Yes, there are people who actually respond to "ENLARGE YOUR PENIS TO TREE TRUNK SIZE PROPORTIONS FOR JUST \$1!!!'

our species has ever made. It's an extension of our humanity and our self-expression, yet ultimately it was always going to succumb to the basis of society as it currently stands – capitalism. Money talks, and online this takes the form of advertising.

In itself this is a great relationship: banner advertising feeds Websites the money they need to keep operating, and advertisers gain increased sales from nicely targeted advertising. Email spam, by comparison, is highly annoying, intrudes upon privacy, and is a waste of the precious resources you pay for.

For a time there was a balance between informative, unobtrusive banner ads and the content of the Web pages in which they sat. Then one day a marketroid thought up an evil method of spreading brand awareness at the cost of the 'user experience', and launched the blight of *popup* and *popunder* ads that now plague the Internet.

For some reason it seems to have escaped the perpetrators of this crime that this, like email spam, is an unacceptable intrusion and a waste of

Website no longer holds any value to them they simply won't visit anymore. This means that the Websites that receive the most traffic hold the most valuable information, and it also means that advertising – necessary though it is – should not impact the users' experience so much that they won't want to come back. Which is precisely, you might notice, why prOn sites don't care about this – because frankly you're going to stick around no matter what.

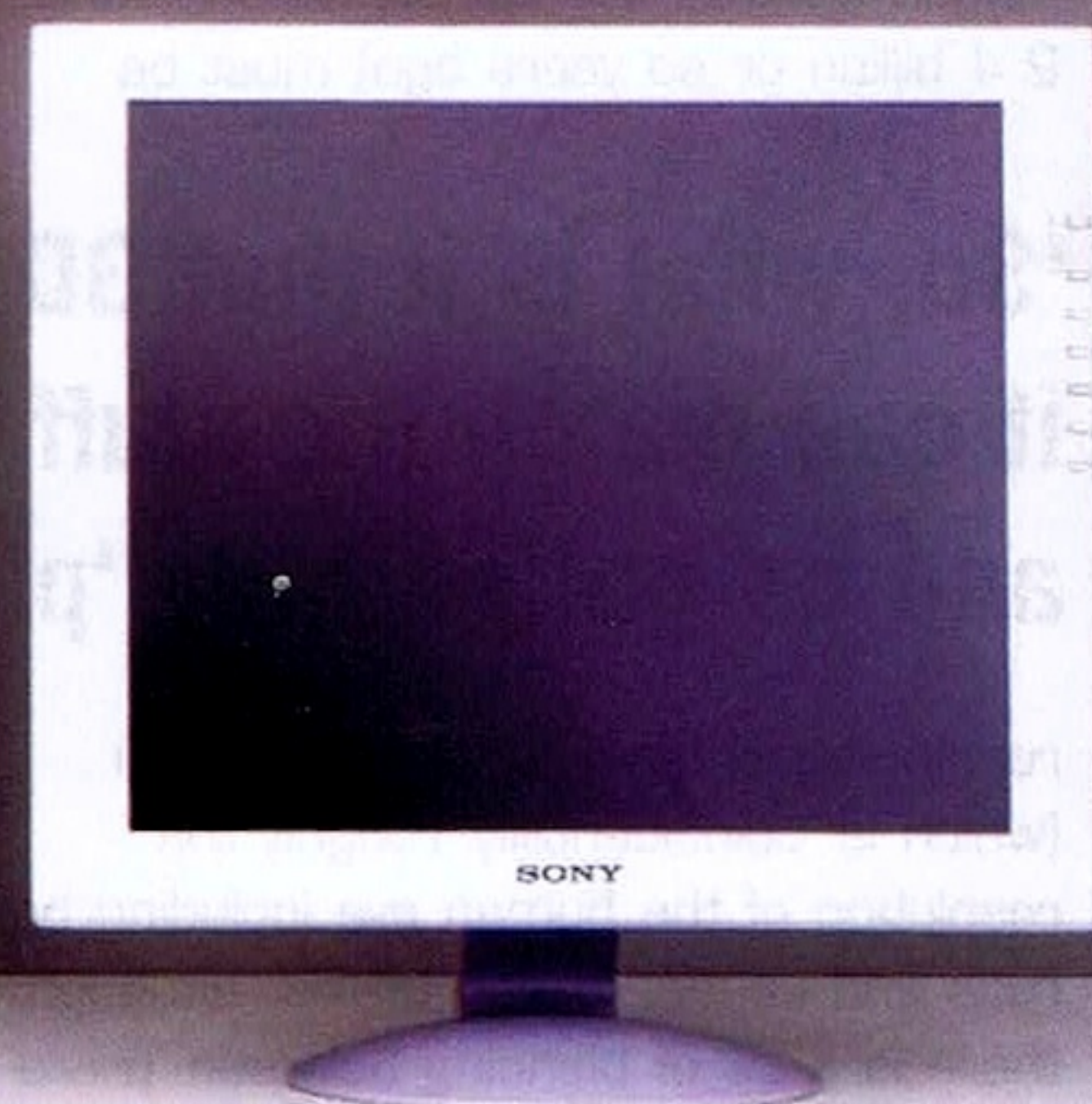
But for the most part, the balance reigns true. Most sites don't use popups and popunders, and banner ads are tasteful, on topic, and unobtrusive. And thus they work.

Unfortunately, the trend is changing. In an effort to increase revenue, more and more sites are starting to use popups and popunders, including major sites such as the *New York Times* (www.nytimes.com) and dictionary.com to name just two.

There is even a newer, particularly vile kind of ad that has sprung up which appears centre screen and borderless, and it *can't* be closed

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See the light

Light is a heavy subject in 3D. Tim Dean wonders where we're at, and in the process becomes illuminated.



We have something of a tradition during the warmer months here at AJB Publishing. At sunset, Angela, our Production Manager, calls an office-wide 'sun break', and we all down tools for five minutes and step outside to drink in the enormity of the golden vista of the closing of another day on God's (or Vishnu's; or Buddha's; or Zoroaster's; or the Kamis'; or Ra's; or Flogron the eight-armed; or whatever ethos/pathos to which you subscribe) great Earth.

What never fails to stagger me, though, is the sheer detail of the scene. Seriously, *Sunset 1.1* (I have a feeling it went through a revision sometime after oxygen entered the atmosphere around 2.4 billion or so years ago) must be

to do before it can match the stuff being done in the cinema, and be called truly 'photorealistic'?

When it comes to photorealism, the two most important factors are lighting and texturing, with animation and detailed meshes (the frames made up of polygons) coming a close third and fourth. The reason that lighting and textures are so important is that 3D has an innate tendency to look, well, 3D. Just think of all the poxy gouraud shaded or shiny reflective spheres that crop up all over the place in 3D. While techniques like gouraud shading were developed in an effort to make things look more realistic, they have a tendency to be so abstracted from the way that things work in reality that they

real-time shadows just so you can walk around without a stuttering viewpoint. This is because when a light hits a surface, all sorts of malarkey occurs. It's unfortunately never just a matter of simple bit of reflection, a touch of diffusion, and a nice shiny specular highlight.

It's malarkey. First of all, in reality, a light source is never a point. It has volume, and different parts of the light source emit different amounts of light. Secondly, when the light hits a surface, some of the light in particular wavelengths (colours...) is absorbed, and some is reflected back. Thirdly, when the light is reflected back, it doesn't always go in a nice, simple, predictable direction because the minute details of most surfaces in reality are fairly coarse and chaotic. Fourthly, things get reflected off surfaces. Fifthly, the light can travel through semi-transparent things, and change in the process.

And so on. Malarkey. . .

The bummer is calculating all this stuff. Advanced 3D software will spend a lot of time working on lighting, and techniques such as raytracing and radiosity lighting take a lot of processing power for a single scene. Then, at least with raytracing, when your point of perspective changes, everything needs to be recalculated.

The way that 3D chipsets get around this is to cheat. And good on 'em. If I was a 3D chipset I'd so not want to have to calculate all this on the fly, so, I'd probably cheat too. There are some very clever ways of cheating these days. Vertex shading; lightmaps; volumetric lighting/shadows; horizon mapping; planar surfaces; anisotropic lighting; and more. But they're still not there yet. If we were just to leave it up to processing power to get to the point where we could use the techniques used by 3D rendering software in real-time, we could be waiting a while. I'm talking 10 or more years before it even becomes remotely possible – and that's probably optimistic. So, we have to wait for more of those devious techs at companies like ATI, NVIDIA and Matrox to discover new ways to cheat the lighting and shadows. It may still be years, but given the progress we've seen since 3D gaming really kicked into gear a few years ago, I think it won't be long.

Cool. Now, back to the sunset.



'So, what is it that 3D gaming has to do before it can match the stuff being done in the cinema, and be called truly 'photorealistic'?'

running at at least 12,960 x 9,720 (which is 'coincidentally' roughly the resolution of the human eye including both rods and cones, in 4:3 terms, although there is a bit of blending between 'pixels' as rods and cones have poor LCD-like response times. . .). It must be running at at least 32-bit colour; because there is no noticeable banding in the colour gradation on the horizon. The animation and lighting are impressive too, with the volumetric clouds casting phenomenally realistic shadows as they pass by.

Anyway, this all got me thinking. How long will it be before this kind of photorealism will be available to us in the gaming world?

Movies these days are doing a pretty good job of getting photorealistic, with highlights such as Aki from *Final Fantasy*, or the arena monsters in *Episode II* (although unfortunately the technology couldn't help the script or the acting...), and Rivendell in *Lord of the Rings*. 3D gaming is coming along pretty well too (heh – understatement), but it has a long way to go before it can match in real-time what studios like Pixar, WETA, ILM or Dreamworks can do with pre-rendered scenes. So, what is it that 3D gaming has

end up looking too clean, too perfect and generally very artificial. Objects in the real world never have smooth, unblemished surfaces, or clear, uniform lighting, and unfortunately it's a real bugger to get 3D things to not look this way. As such, there are a heap of techniques to make things look rough, dirty, smudged, dented, irregular, and generally 'real'.

There are a lot of groovy things that 3D chipsets do these days that can make things look pretty good, and some old staple texture filtering techniques, like bump mapping, are being applied in real-time to make the scene look more realistic, but there is still a long way to go before 3D chipsets can match in real-time what the pre-rendered scenes can achieve. And this is mainly due to lighting.

Lighting, you see, remains a bit of a nugget for 3D chipsets. The problem is that concrete reality isn't hindered by mathematical abstraction in order for things to be lit. If you're sitting in your living room, and you switch on another lamp, you don't see everything slow down to a crawl until you turn it off. If your game avatar does the same with advanced lighting techniques, things are different, and you may well contemplate disabling

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- LAN on board- RealTek® RTL8101L
- Modem Riser(Optional)
- AC'97 6-channel audio
- 5 PCI/1CNR/1AGP
- S-Bracket(Optional) / D-Bracket™ / Live BIOS™ / Live Driver™ / Fuzzy logic™ 3

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- Dual Programmable Vertex Shaders
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Link to the Future

A new way to be wrong

Daniel Rutter gets busy with fizzy lemony database pollution, and proves you shouldn't try to learn life saving procedures online.



A popular objection to the use of the Internet as a research tool is that the information you find there isn't reliable. Neither are *books*, of course, but the Web has fewer editors and librarians, so there's certainly some validity to this common complaint.

Unreliability of Internet information takes two forms.

First, there's plain old wrongness – but it's often in the middle of a bunch of correct stuff that lulls you into a gullible state.

There's a term for this phenomenon: it's 'database pollution'.

Take, for instance, Penn and Teller's Swedish Lemon Angels. The Angels are un-makeable biscuits from P&T's

Really Hidden Files' –

www.fuckmicrosoft.com/content/ms-hidden-files.shtml – which has been linked from the front page for ages now.

This latter screed, written by a person glorying in the name 'The Riddler', tells you about all sorts of apparently privacy-infringing secret data collection by Microsoft.

The first version of that page was, to two significant digits, a bunch of misleading hokey.

It's not perfect now, but it's better.

But if you believed version 1.0, you're going to look like a doofus if you point to version 2.6b as evidence for something that the page doesn't say any more. www.archive.org will provide

doesn't want you getting at them, rather than the fact that there was an exploit some years ago in which a I337 h4XX0r would take rapeyourpc.exe and rename it to bunny.jpg, then stick in a Web page. Try to load that page and the renamed program wouldn't display, but it *would* end up in your browser cache, from which it could be executed by other software. The random-named cache directories are a kludge to stop that sort of thing from happening.

The Riddler's also still unhappy about the fact that Outlook Express doesn't automatically compact mail folders after things are deleted, with the result that even after you delete email from the Trash folder, the messages will still be there in the DBX file. OK, maybe Microsoft should have put in an auto-compress feature if someone's just deleted the entire contents of a folder, because compression should then be quite fast, instead of the usual lengthy drive-flog. But then the data wouldn't be recoverable in the event of an accidental deletion, of the sort suffered strangely often by Outlook Express users. The Riddler also still tells you that Cookies Are Bad, m'kay. But, like a bunch of other cookie-phobes, he doesn't tell you *why*. Lots of people seem to be under the impression that cookies let Websites find out things about you that you haven't already told them. That's not the problem; www.junkbusters.com/cookies.html gives a less than totally alarmist explanation of what the problem really is.

Personally, I rather like not having to log in to various low-security Websites. My numerous daily visits to spamcop.net would drive me nuts if I didn't use cookies.

Startlingly, there is actually a point to this rant which doesn't happen to involve grand sociological statements about two-edged swords and the slippery slope of revisionism.

It's that the changeability of Web based info, as well as its reliability at any given time, is just something that it pays to remember.

Because it gives you a new way to be wrong.

‘. . .when you're instructed to “add the lemon juice all at once and blend into the mixture”, said mixture foams merrily out of the bowl.’

excellent book *How To Play With Your Food*. The recipe includes both baking soda and lemon juice, and when you're instructed to 'add the lemon juice all at once and blend into the mixture', said mixture foams merrily out of the bowl. And hilarity ensues.

The Swedish Lemon Angels recipe can be found lurking without warnings in various online recipe books, including *RecipeLand*, *RecipeSource* and *Chef2Chef*. Fizzy, lemony database pollution, kids.

The second kind of Internet info unreliability is actually good, in a way. It's *mutability* of information: a page that said one thing when you first looked at it may now have been corrected to say something else.

There's a fine example at fuckmicrosoft.com.

Can I say fuckmicrosoft.com in a column? I kinda have to, since you're not going to find a site at 'www.f*ckmicrosoft.com'. My apologies to anybody I've shocked.

Anyway, the above site contains some pretty good reasons not to like the Dark Lord Bill's empire.

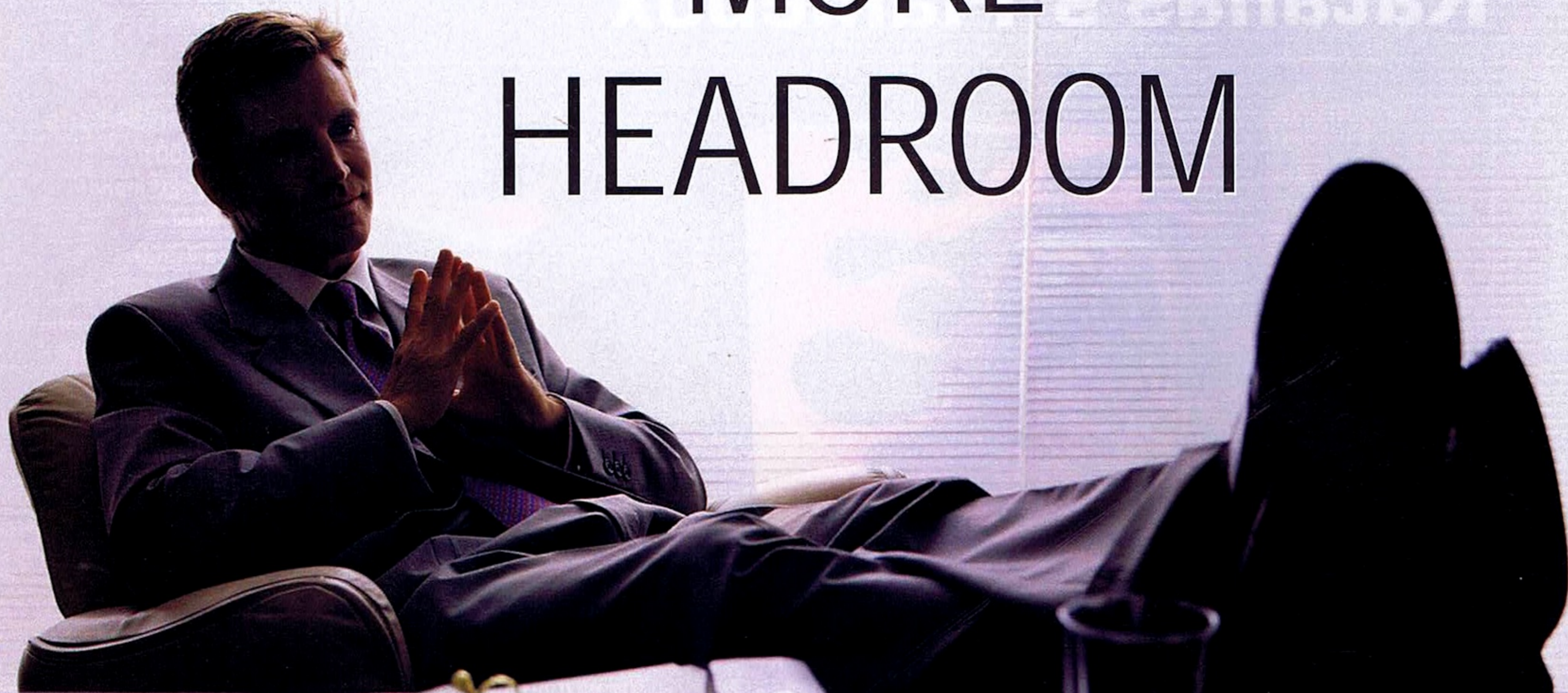
But it also contains 'Microsoft's

you with an explanation of your mistake, but it won't give you an excuse. By The Riddler's definition (in all versions of the page), the computer I'm using at the moment has well over a gigabyte of stuff in 'folders that Microsoft has tried hard to keep secret'.

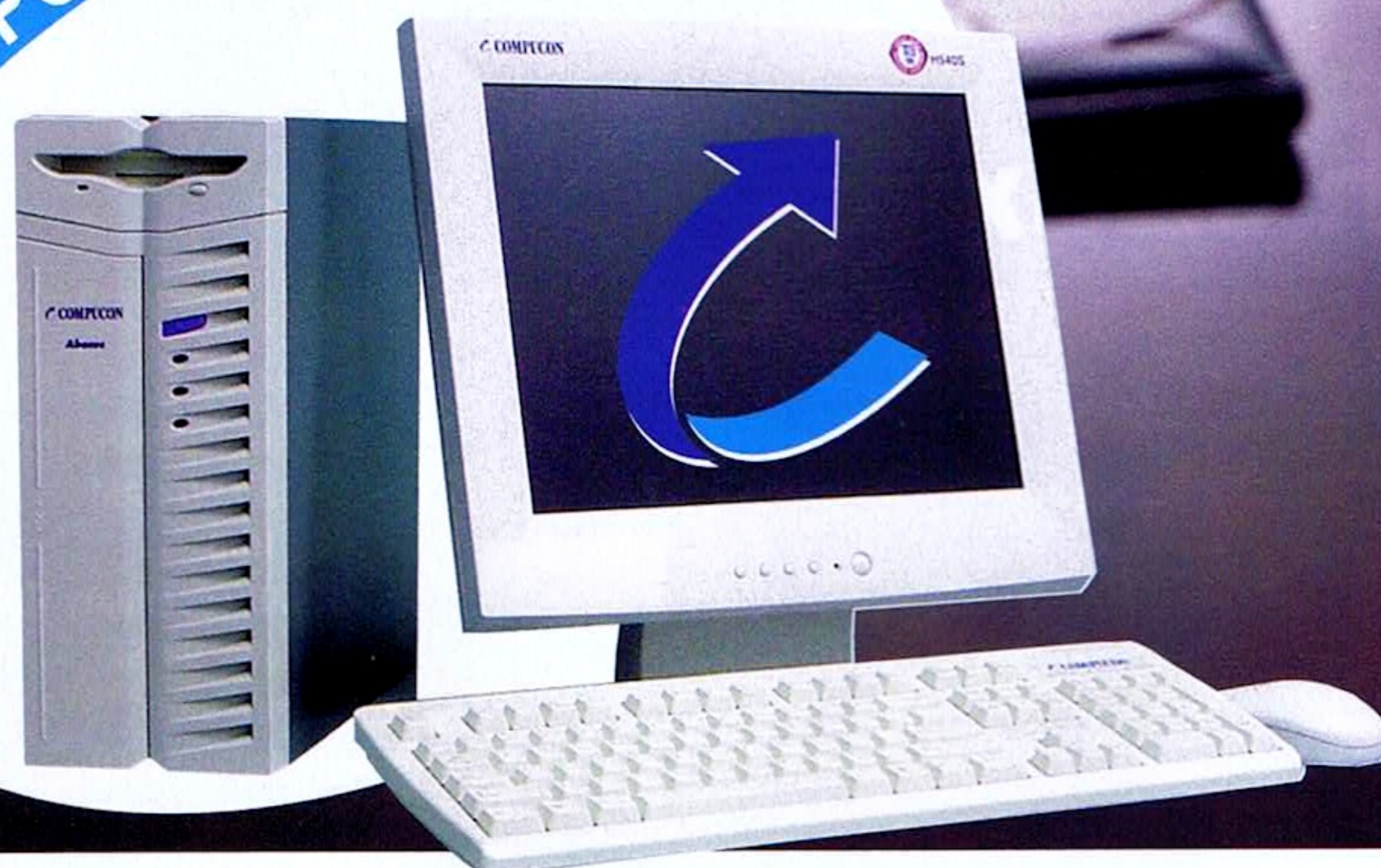
This is, in my view, a rather uncharitable way to describe temp files, the swap file, the cookie file, the browser cache, URL auto-completion, and so on. There is quite a bit of Windows data that's not quite as deletable as you might think, and that may be a security risk for those of us with meth labs in our garage or inquisitive younger siblings. But for most people, it's more of a disk space wastage issue than a privacy one, and not much of a problem either way.

The Riddler still tells you that directories that have the System attribute must have it for nefarious reasons, rather than to strongly discourage the uninformed from blundering around in there 'making space'. And he still implies that the reason for Internet Explorer cache files being inside weird alphanumeric-named subfolders must be because Microsoft

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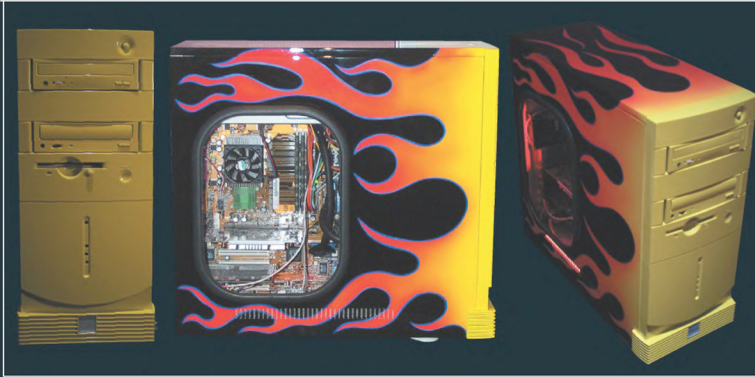
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Katanas's Flamebox



Technical details

- AMD XP 1600+
- ASUS A7V226 mobo
- 512MB RAM
- GeForce3 Ti500
- SoundBlaster Live!
- 40GB Seagate Barracuda HD
- Sony 12x16x40 CD-RW
- Sony 16x DVD-ROM
- Two 80mm Sunon fans
- Black rounded IDE cables
- Red neons
- Custom flame paint job
- Three coats of clear finish
- Windows XP

The Story

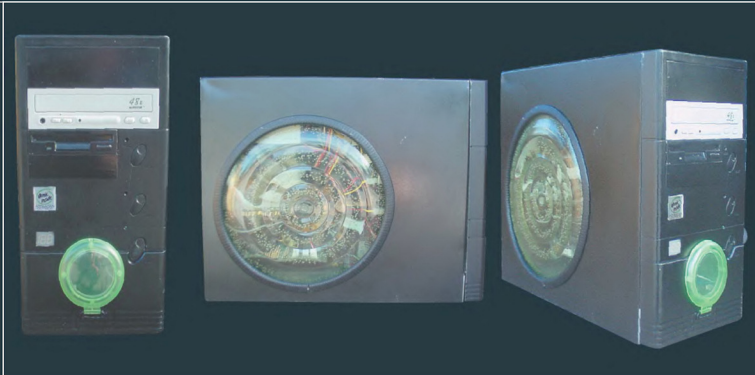
Late last year I decided that I desperately needed an upgrade, so at the same time I decided to do a case mod. After some major dramas trying to order a custom case through the Internet, I finally decided to bite the bullet and try to do one myself.

I bought an old case off a friend of mine, and decided to do the usual thing and take to it with a jigsaw and cut a large hole for the Perspex window.

The next problem I had was to think of a design for the paintjob. I'm full on into flames, so I decided that I would hunt around for an airbrush artist to do the job, because I know that I couldn't do what I wanted myself. After two weeks the flamebox was born, with three coats of clear finish that gave a magic look to the case.

The next job was to put in the Perspex window and the neons and the case was born. It was a lot more satisfying doing the case myself, and not as hard as I thought it was going to be. □

Sonictail's ShitBox



Technical details

- Pentium 166MHz O/C 200MHz
- 32 MB EDO RAM
- 2 GB HDD
- 210MB secondary HDD
- Windows 98 SE
- Network card
- SoundBlaster 16
- Dual custom-made HDD lights
- 8MB S3 Virge
- Plastic plate window
- Inventive use of clock
- Home made rounded cables
- Total cost = \$25
- Will not run Halo

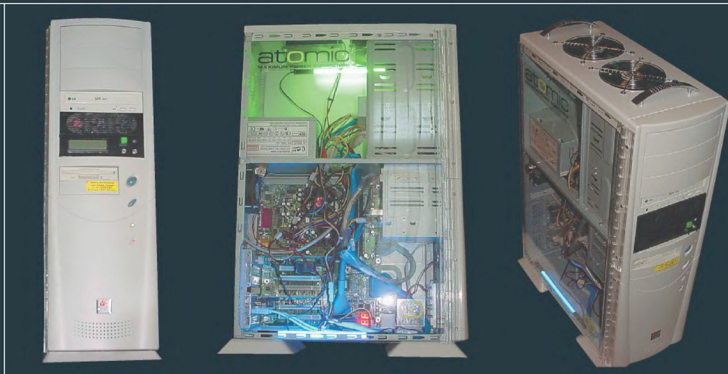
The Story

The mod began at a LAN where Scapegoat and Fart 'n' Piss renamed my PC as the ShitBox(TM) on the network. A challenge was then set: parody the Xbox for as cheap as possible! This task was tough, so I went out and bought a plastic plate for the window, a couple of cans of paint and a clock, each costing \$2. Then back at home I spent a while getting the jigsaw and the box acquainted before painting. Several coats of black and clear paint later I realised that trim was required to line the window, so I went to the local Clark Rubber and bought some

good looking stuff, which ironically turns out to be the most expensive part of the mod. Attacking the front with a hole saw was quite fun, and after working with some sandpaper, the hole was rounded for the front of the clock. Two LEDs were attached underneath the rim and now it glows whenever the PC is thinking.

After attaching the window and the LEDs using hot glue the mod was finished: it was meant to be a bad looking Xbox but my friends were surprised when they saw the good looking case, and it was all done for less than \$25 – now to start designing the ShitCube! □

spamz0r's b3@5+



Technical details

- Athlon XP 1800+ @ 2000+
- Epox 8kha
- 128MB DDR PC2100 Samsung
- GeForce2 MX 64MB w/TV-out
- Onboard sound :)
- 52x LG CD-ROM
- 30GB Seagate 7400RPM HDD
- Realtek 10/100
- 400 watt Omni PSU
- Perspex door plus key and lock
- Custom baybus plus LCD
- Case handles
- Two 120mm 3400RPM fans (out)
- Two 80mm fans

The Story

After buying my first *Atomic* (issue #3), reading the article about the blowholes and thinking this was hardcore, I proceeded to look at page 18 every month. During this time I modded my old case which was of very bad build quality and I decided to buy a new case with a bigger PSU after salvaging my neons, handles, and two 80mm fans. I thought this case was way too big for my 80s and small window, so the next thing I did was buy two 120mm 3400rpm fans, a pre-cut window (from

where ever) and some clear hinges (also from where ever). Wanting an original idea I decided against making a window and instead made a door – that way you can see everything and get the full effects from the neon lighting. My baybus was from my old case as well, which had been spray-painted black, as with the HDD cooler.

P.S. I would like to make special thanks to readerr0r for letting me use his spare Atomic stickerz which are sickhouse on my new Perspex window, kudos to you!

Bastard Child's Furry Muff



Technical details

- Wintel p3-800 98SE
- 256MB PC-133 SDRAM
- 32MB TNT-2 AGP
- 30GB, 7200RPM HDD
- 17" KTX CRT
- Hercules Muse XL
- Creative FPS1500 surround
- Three *secret* devices, including anti-theft siren and laser
- 'Delighted' mouse (hehe)
- Eight green dyed cats
- One green dog (medium)
- One red fur car seat cover
- Two litres of superglue

The Story

I've used a method dubbed 'furring around' to cover the entire case and components with \$13/metre fur, except the scanner, keyboard and mouse, which are hairless. The face is of yours truly – and as the vents holes on the sides were covered over, I've had to cut a series of vents into the lower portion of the side. I've installed a thin metal mesh over the openings to keep dust and fur-balls out. The mesh is normally used in the construction of carbon-composite F-18E/F Super Hornet components. It helps dissipate static electricity so a lightning strike

doesn't turn the plane into a Mach 1.8+ charcoal brick – just don't tell my boss where it came from.

The case includes three stealth devices: a small \$20 personal alarm, which will go off with an ear-splitting screech if a fellow LANer bumps or lifts my case; a \$2 laser pointer where the HD LED used to be; and a special 20KHz horn known as a 'Woofor Stopper', which is meant to stop barking dogs, but is also heard by 40% of the population (including me). Needless to say, my mod provides hours of annoyance for other LANers.

Atomic M337 V2.0

It was a cold Sydney night in May, but the warmth broke past the little red 'Hot' line on the thermofunometer. Smoldering, it was, in fact. For the Atomic M337 V2.0 was indeed a night where the woots were heard across the country, around the world and rocking the block where we had converged on an unsuspecting bar in Sydney.

M337 V2.0 was held in a sports bar on the night of two footy semi-finals, but the geeks quickly engulfed the sportos, and the allegiance of the World's Biggest Bloke – the Tongan bouncer – quickly switched to the happy looking little people with kooky nametags. We owned the night.

With love we greeted friends whom we'd only ever had text with previously. Woots of 'OMG OMG' resounded through the smoky haze, as the style and overall attractiveness of Atomicans became apparent to all who came, and those who thought they'd be the only spunks there were momentarily disappointed, before jubilant camaraderie took hold, never to let go. It was a beautiful night, with beautiful people, beautifully shiftdaced talking quality trash, while hugging, groping and accidentally touching in all the right wrong places.

We pooled hard, we tossed the Rex around in the sand and we, as a venturing

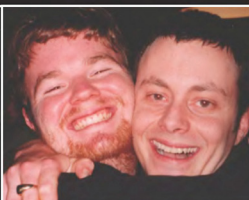
party, sucked down noodles by the wokload. We even raised \$74 for charity, which represents approximately 1-2% of the estimated alcohol expenditure.

Sometimes fun isn't always fairly shared, but if an Atomic M337 isn't a needy cause then supporting Australian brewery and hospitality workers must then surely be.

M337y joyful thanks to all who came. Sorrowful tears for those that couldn't. Every week there's something Atomic to do, that's why we have the ever so busy Community Events forum on our site. But this was the Big Bang and stupendously wondrous it was. Woot!



▲ Ashton (Martigen) & Mael



▲ Brad (Zeddicus) & Bennett hug



▲ Angela, Stuart (emagica) & Arny



▲ Atomic Super Friends



▲ Tim Dean (Zuel), Angela & KatieK8



▲ chancellor, _haunt_ & Gramyre



▲ Silhouette & Felipe wobbling



▲ Wilkshake & Mael not AtomicWaste-d



▲ John (GRIMEY) & Bennett giggle



▲ John, Princess Angela & Bennett



▲ HCB holds it all together. . . just



▲ Bennett (GunSlinger), KatieK8 & Ben



▲ g_day says 'G'Day!'



▲ Klubberhead, Virlix, Silhouette & Brett



▲ Madeleine & Clsco sharing a smirk



▲ ChaosLady shares/steals Vanna's drink



▲ Gramyre, Clsco & Ben say 'hmm. . .'



▲ Krista's 30pin 120ns necklace



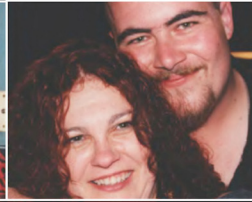
▲ BobTheMonkey & Chris w/chips



▲ A sextet of Atomicans misbehavin'



▲ Tim, Princess Angela & KatieK8



▲ ChaosLady & John share some hair



▲ Catherine & Bennett mindmeld



▲ Porn, Oni, Jo & Rasta59 hang tough



▲ InfoJunkie & Porn discuss



▲ Winston serves up the Atomic goo



▲ Princess Angela & Katie K8 w/pout



▲ Oni finds a thing to poke a stick at



▲ BTM, Tim & AccessDenied get messy



▲ Wilks, _Haunt_, Gramyre & Mael



▲ That's Mrs The_Dude & The_Dude



▲ ArcaneMagik waiting to ROFL



▲ Maksym chompin' on a stoogie



▲ Tim's teeth aren't as good as his



▲ Demented Freak feels the love



▲ Brett, Demented Freak, VirIix



▲ Bennett & ChaosLady LOLing evilly



▲ Ashton, KatieK8, Zedd & Namaste



▲ Chris & Krista get cuddly. . . aww



▲ Boxhead is scared of Evil Bennett

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Supports UDMA ATA 100/66/33 IDE interface
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Onboard AC97 Audio support

AV45GTR



VIA P4X266A/VT8233 Chipset
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Supports AGP 4X and 6 USB ports (1.1)
Support UDMA ATA 100/66/33 IDE interface
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E3: And then there were games

Bennett Ring thought he'd died and gone to heaven at this year's E3. After breathing into a paper bag to calm down, he managed to find some killer new games.

There is a magical event once a year in a far off land of angels that is known as E3. A mystical gathering, it's where all of the world's game wizards come together to steal each other's ideas and to try to pimp their wares to those with unimaginably large wallets.

To the newcomer it can be an overwhelming kaleidoscope of giant screens, piercing lasers and thumping audio systems. To *Atomic*, it is the definition of gaming Nirvana.

Sony totally dominated this year's E3 in terms of floor space, with a giant stand laden with upcoming but definitely unglamorous PS2 titles, spectacularly high tech display devices, and of course, scantily clad temptresses. But in terms of sheer gaming joy, it appears that Microsoft's Xbox was the dominating platform at the show. Indeed, our pick for Best Game of E3 just happens to be an Xbox title. We're sad to say it, but once again the PC took second place to a console at E3.

Of the PCs that were in use at the show, there seemed to be a fairly even split between those powered by Intel and AMD. This wasn't the case with video cards, as the GeForce4 Ti4600 totally dominated as the video card of choice. A notable exception to this was in the Doom III demo PC, which used ATI's upcoming super card, the R300, to churn through the frames.

A couple of events stuck out amongst the blur of activity that was this year's E3. First up was the behind-closed-doors session with a certain Shigeru Miyamoto of Nintendo fame – if his latest game Animal Crossing didn't prove that he's

losing the plot when it comes to game design, in terms of the Western world at least, then nothing will. There's only so far Mario can carry a designer. And if that last comment doesn't inspire some *Atomic* reader to hire a Ninja assassin to take us out Tenchu 3 style, nothing will.

Then there was the arrogance of the GPU Giant NVIDIA, who laughed off suggestions that the upcoming Parhelia or P10 video chipsets are anything for it to be worried about. NVIDIA obviously has something up its sleeve in the NV30 that's keeping it feeling all warm and fuzzy amidst the recent bout of graphic processor announcements.

Finally, the nightmarish scenario of a game being run side by side on a high end PC and a console – with the console version looking decidedly better than the PC – became a reality.

Condition Zero is a prime example of why: on the PC it won't use advanced DirectX 8 features, but on the Xbox it will. This is because the developer realises that most PC users won't be able to use these features, due to the lack of GeForce4's in boxes across the world, while all Xbox users are graced with a fully DirectX 8 compliant equivalent in the NV2A.

While 95% of what we saw wasn't worthy of feeding to a mangy stray dog, the epic journey was worth it alone for the amazing 5% of games that totally rocked our world. If there was any doubt that gaming isn't evolving in leaps of bounds, these gems among the crap proved otherwise. Without further ado, let's check out some of the titles *Atomic* was most impressed by.



Splinter Cell Xbox



Tack the name Tom Clancy onto a game, and you're guaranteed to have a title that is going to sell well. So it's refreshing to see that the developer of this game hasn't rested upon this license to release a sub-standard generic clone of every other stealthy third person action game (read Metal Gear Solid 2). In fact, we'd go so far as to say that this game is our pick of E3. Yep, even better than the mighty Doom III.

So just how does this unknown title blow away the mighty Doomster? Maybe it's because the lack of hype surrounding it makes the stunning graphics, with some of the most amazing volumetric lighting and shadows ever seen, all the more impressive – or could it be the cool factor of playing the role of a solo agent with an arsenal of devastating real-world weapons? We're not sure, but we do know one thing: this exclusive Xbox title (until 2003 that is) is going to totally rock your world.

While it's very similar to MGS2, it doesn't rely upon stunning yet non-playable cut scenes to impress the player. Instead you'll be blown away by the in game graphics, with some of the most impressive lighting effects ever seen. Sure, Doom III had slightly better lighty bits, but that was running on a Pentium 4 with an ATI R300 video card, not a sub-\$400 console. It's simply amazing to see what the developer has squeezed out of the little Xbox, making full use of the DirectX 8 vertex and pixel shaders of the NV2A graphics chipset.

Judging from the limited playtime we experienced, gameplay appears to be both intuitive and realistic. Stealth is the name of the game, hence the similarities with MGS2, and the light meter that indicates your visibility while in the depths of dark shadows will no doubt prove to be crucial to guarantee mission success.

You can expect to be playing this game before Christmas – if you own an Xbox you should start counting down the days until then. Expect the PC port in early to mid 2003.

Far Cry



Far Cry, formerly known as X-Isle until Myth III Exile confused things, was another one of those E3 games that we'd heard next to zero about but were blown away by when we saw the demo. It's yet another first person shooter, but does it so well that we simply had to tell you about it.

It's the game's glorious graphic engine that really got us hyped. Making full use of DirectX 8's advanced pixel and vertex shaders, it does both indoor and outdoor scenes equally well. When inside any of the island's many indoor locations the astounding real time lighting and shadow effects were shown off to full effect, but step outside and the engine's ability to render massive distances opens up the possibility for extreme range combat.

Luscious, thick vegetation makes the ability to sneak up on the bad guys a valid tactic, but make a noise and they'll be on your tail in no time. We watched in amazement as some heavily outgunned AI troops called in reinforcements by deploying a smoke marker. Before we knew it, an Osprey was hovering over the smoke grenade, with several enemy units rappelling from its open doorways.

Due to the vast nature of the maps, heavy use is made of tracer fire, so the player will always know which direction they're being attacked from, avoiding what could have been an otherwise frustrating situation. The ability to shoot through certain materials is yet another feature that this engine incorporates.

Finally, the editor for the game is almost as impressive as the game engine itself. The ability to edit maps in real time, and then play them instantly, will make modding this game a total breeze – something the developer is keen to see occur. To spur the mod community along the developer is planning to release the game engine early to the modders, so you should see some amazing mods soon after the game's release. Only a year into development, this game is shaping up to be a kick arse title. Keep your eyes peeled Q1, 2003.

Doom III



Using an all new, all spiffy game engine created by the Lord of the Code, John Carmack, this game promises to take the first person shooter genre to the next level. Or not.

You see, while this game has easily the best looking indoor environments and characters yet to be seen this side of a pre-rendered cut scene, the grunt necessary to power such awesome visuals means it's limited to very cramped indoor settings. Which is basically the opposite direction most first person shooters are now heading, that being the great outdoors. While the lack of vast, expansive environments is disappointing to say the least, the sheer graphical delight of the demo we saw almost made us forget all about long range combat. If you thought you'd played a scary game before, think again. The full real time lighting effects, foregoing the use of lightmaps, created suspense in a way that no other game has come close to. Using strategically placed lamps, and the occasional flash of gunfire, the player would often encounter a demon-possessed zombie soldier at the last possible moment.

The character models are the closest to photorealistic yet on any platform. Watching a huge beast chew into the guts of a dead fat bastard, as his skin ripples and wobbles with each bite, was totally disgusting, yet totally entertaining. You've got to love realistic gore. These visuals come at a cost: the machine running the demo was a Pentium 4 with the next generation ATI R300 video card in place. It didn't drop below approximately 40 frames per second, which means it will probably run at about two frames per second on anything less.

It doesn't look as if the innovation has been carried on to any other area of the game play. However, now that the graphic engine is nearing completion, it has plenty of time to ensure it does something special with the rest of the game. After all, it's not due for release until Q1, 2003.

Metroid Prime



HALO for the GameCube is what Metroid Prime is going to be, not that Shigeru would ever admit to it, being the first person shooter hater that he is. As far as Nintendo is concerned, this is a first person puzzler. Translated into Aussie gamer speak, it's a first person shooter with more puzzley bits in between the brain splattering bits.

As far as the engine is concerned, this is looking to be a spiffy game indeed, although it has a very different look to HALO. While HALO looked a little blurry over long range views, Metroid Prime stays crystal clear regardless of how far you're looking. Considering the inferior hardware in the GameCube when compared to the Xbox, it's pleasing to see the GameCube outdoing Microsoft's beastie. A nice touch is the third person view when you morph into a giant ball – you'll often need to do this to get past certain puzzles. Another major feature used to solve puzzles is the scope view.

By activating this and looking around the level, puzzle components are highlighted; you then need to figure out what to do with these components. Other than the unique function of this scope, it also uses some spiffy graphical effects that distort the area not being zoomed into. In keeping with the Metroid series, gigantic boss creatures appear throughout the game, some of which look to be very difficult to conquer. Unfortunately no mention was made of multiplayer support, so it looks like you might have to play this game solo.

In the drought of decent GameCube games at E3, Metroid Prime stood out as showing what the GameCube is capable of. We're hoping that Nintendo's dislike for violence doesn't tone down what could be a very fun first person shooter, but we're prepared to live with green blood if need be.

SOCOM



What do you get when you combine a third person perspective with the gameplay of Counter-Strike and the PS2's online capability? SOCOM is the name of the game, and it stood out as being THE PS2 game of E3. Well, from a die-hard Counterstrike Beta 1 veteran's view at least.

While a third person perspective may not sound like it's going to work with this style of gameplay, it actually controls very well. It's yet to be seen how the network code handles the trial and tribulations of the Internet, but it was working seamlessly over the LAN Sony had set up at the show. From the demo we saw, it appears that teamwork is going to be the main mode of playing, which is indeed a good thing.

Once you're dead, you'll have to wait until your team mates either accomplish the objective, kill off the other team, or all die trying – very similar to Counter-Strike, and a style that encourages intelligent strategies as opposed to simple run and gun, shoot and scoot tactics.

Other than standing out as being one of the cooler PS2 game concepts on display, it was also noteworthy for the very polished graphics engine it was running on. Most of the battles we saw took place in large open maps, looking very natural and organic, with sniping playing a key role on the road to victory. In another move similar to CS, SOCOM promises to strive for realism. This means you can expect to be busting a cap with the latest and greatest in real world military hardware and equipment. One thing sorely missing was a team comms system, but we're sure they'll implement it in time.

Now we just need confirmation of Sony's online strategy before we can start getting excited about playing games like this on the PS2. Unfortunately Sony didn't have any details about their online strategy, other than the fact it's broadband only, so don't hold your breath.

The Getaway



While Sony claims that this is going to be a revolutionary game, it's really nothing more than a glitzed up GTA3. Which isn't a bad thing when you consider how many awards GTA3 scooped up.

And if you thought GTA3 had the Australian censors in an uproar, just wait until they cop a load of this gore fest. A memorable highlight of the brief demo we saw involved the removal of the brain of a human shield via the use of a close range head shot. Suck on that Mr Censor man.

While it's a bit of a rip of the GTA3 concept, The Getaway does include a couple of innovative features.

The fact that it's based on the real world topology of London means that Brits will find the environments very familiar. It also helps to establish a very *Lock, Stock and Two Smoking Barrels* feel to the game, with British gangsters being the prime characters in the game.

The indoor graphics were very impressive, with detailed characters and environments, but the outdoor scenes exhibited the number one problem we have with PS2 visuals – texture shimmering at long range.

This was very noticeable, and we'd even go as far as to say that at times this game can look downright ugly, much like the main protagonist you'll be playing, who bears a striking resemblance to our friend the ever-contipated-looking Max Payne.

Liberal use of the F-word, and we don't mean 'Fudge', helps to cement the fact that this is a game targeted at an adult audience, so we can only hope that Australia finally gets an R rating for games before it's released.

If this game shapes up to be as good as the now-legendary GTA3, then Sony is going to have a killer game on its hands. Considering it was perhaps the number one title Sony was pushing, the chances of it achieving this are high.



Combat Flight Sim 3



Remember how much the dynamic campaign in Falcon 4 sucked anus? Well, CFS3 also contains a very similar dynamic campaign, with random AI controlled events and sustained damage to targets over missions, but promises to be at a much lower level of suckiness. This means that each and every time you play the campaign, it should be a totally new experience.

Much work has been put into the AI, so that persistent units throughout the campaign react to your actions. For example, you might be flying enroute to a target, and you'll pass a German airfield. The AI will determine whether or not you're a threat that needs to be dealt with, and may decide to launch a flight to take you down. When you realise that none of these actions is pre-scripted, it's hard not to be impressed.

By setting the game between 1943 and 1945, it allows the game to include some of the more exciting experimental aircraft that began to emerge in the latter stages of WWII. Indeed, some of the aircraft on show were absolutely bizarre, looking as if they'd been designed in the 1960s, not the 1940s.

Instead of dogfighting over the plain blue seascape of the Pacific, you'll be doing battle over war-ravaged Europe. This time around there will be much more of an emphasis on ground attack than air to air, which has necessitated a totally new graphics engine. Full multiplayer support is of course included, and the developer promised that the jerkiness found during multiplayer bouts of CFS2 will be worked on, leading to a smoother playing online game.

Strap a gorgeous engine on to the front end, with some of the prettiest clouds and aircraft detail seen since IL2, and CFS3 is shaping up to be a worthy successor to the Combat Flight Sim series.

Unreal Tournament 2003



If there's one main competitor to Doom III, it has to be this game. The Unreal series has grown up side by side with the legendary Quake series from id, so it's no surprise to see that Doom III and Unreal Tournament 2003 are both due to be released at around the same time, that being the end of this year/beginning of next year.

We were able to play a couple of levels of UT2003, and are happy to say that it's shaping up to be a triple A title. The new graphics engine is certainly a stunner to look at, but it's very different to that used in Doom III. Where Doom III's main strength appears to be lighting effects and character modelling, UT2003's main focus is large open levels with natural looking environments.

In fact, the added detail made it quite difficult to focus on shooting our opponents, as we'd often spend a few crucial seconds checking out some nifty feature of the environment. Before we knew it we'd be chewing on a flak shell. It's not only the environment that has been beefed up significantly, as character models are also looking much more detailed than in the previous version of the UT engine. Unfortunately they're nowhere near as detailed as those seen in Doom III, but that's the price you pay for having large expansive playing areas.

You'll recognise many of the weapons from the previous UT games, but there are a few new ones to delight in. The effects for all of the weapons are especially attractive, again making it hard to focus on your target and not your bullets ricochet effects. Likewise the effects for many of the levels, which appear to be prettied up versions of the most popular maps from UT. If you're a fan of first person shooters, the future sure looks bright. The huge play fields of UT2003 promise to bring something new to a highly competitive genre towards the end of this year.

Star Wars Galaxies



This game promises to be the next best thing to getting sucked into your television screen while one of the *Star Wars* movies is playing on your DVD player. Unfortunately, apart from a brief movie of the game in action, there wasn't much to be seen of this highly anticipated title. However, from the little we did see, it's shaping up to offer a spectacular experience.

If you're expecting a totally revolutionary MMORPG, you're going to be sorely disappointed. SWG uses the same formula as Everquest and Anarchy Online, with the focus of the game being quest completion. Likewise with the combat, which uses a rule based system as opposed to a twitch based system. There are going to be between eight and 12 planets in the final product, each vastly different to each other. If you fancy yourself as the next Darth Vader or Boba Fett, you're going to have to stick to your monthly *Star Wars* Geek Meets, as these characters are going to be NPCs. The developer is hoping to implement the ability to hand the control of these characters over to Game Masters for special events, which sounds very cool to us, but it would be nice if highly advanced players got the chance to take on these roles.

One of the bigger announcements regarding this game was that it will be playable on the PS2 & Xbox, as well as the originally announced PC version. Plans for a space combat add-on, which was supposed to be launched six months after the release of SWG, seem to have been put on the backburner as the developer concentrates on completing the main part of the game.

The scene we saw revolved mainly around Stormtroopers wading through a variety of locations, with the main focus being a swamp area. A massive AT-ST stomping past showed just how huge the vehicles are going to be, while a couple of wild Dewbacks highlighted the game's amazing animation system. Prepare to put your real life on hold Q4, 2002.

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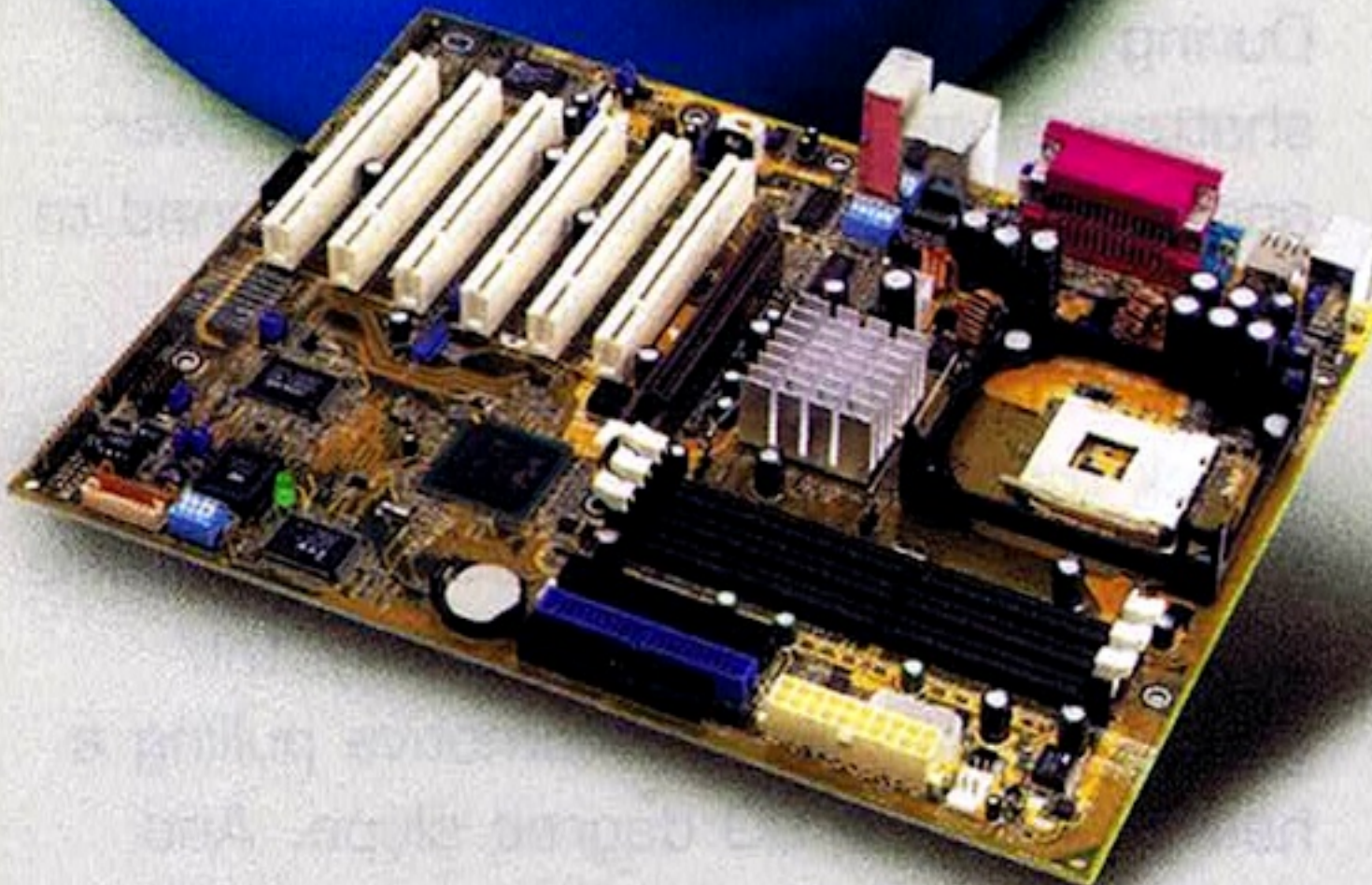
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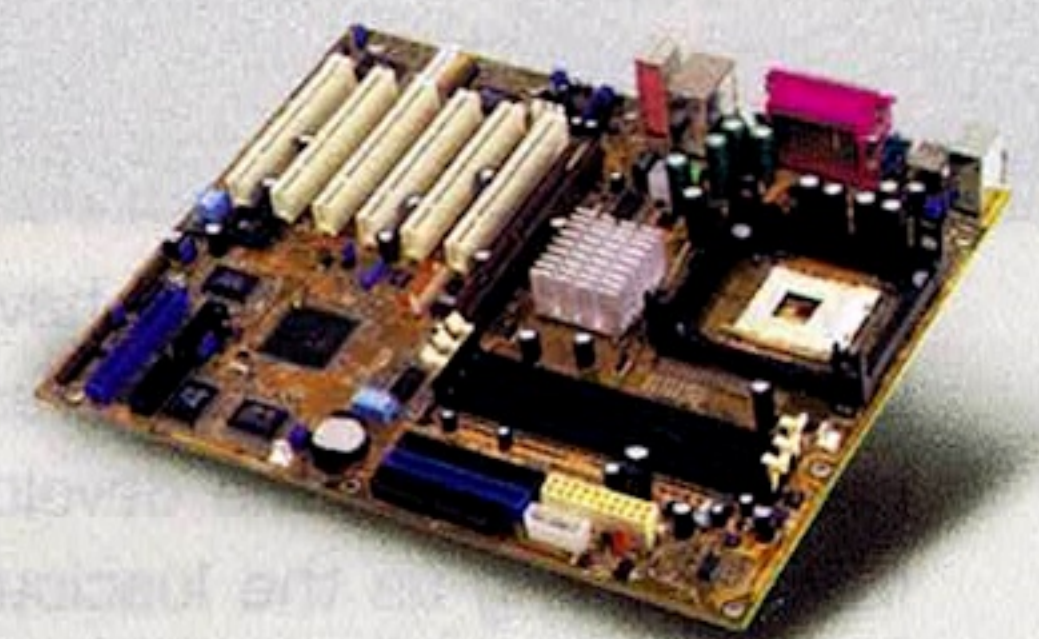
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Age Of Mythology



Bringing the Age of Empires gameplay you all know and love to life in full 3D glory, AOM was one of the most impressive RTSs on display at E3. The highly detailed engine flowed by at a ripping frame rate, while the 28 different mythological creatures brought a level of fantasy to the series not seen before.

As far as gameplay goes, it's pretty stock standard RTS fare, but it sure looks purdy. The biggest departure from the AOE series is the inclusion of heroes and creatures. You also begin each level with a limited amount of God Powers, which can decimate an entire army with a single mouse click. Knowing when to use these limited powers will be one of the greatest challenges for budding Gods.

Lock-On



It's been a long time since the last decent modern flight simulator hit the PC, but that's all going to change with the release of Lock-On. From the highest of altitudes down to mud scraping levels, the engine is a pure delight to behold. We saw the A-10 cockpit in action, and were most impressed by the accurate and fully functional modelling of each and every gauge. And don't even get us started on the mouth watering aircraft models, of which the F4 Phantom was a firm favourite.

Unfortunately we didn't get any hands on flying time, but the developer is promising a ruthlessly accurate flight model, which is of course scalable so as not to scare the newbies off.

StarFox Adventures



Due to a licensing issue with the StarFox name, the previous iteration of this title was known in Australia as Lylat Wars. So we're not quite sure what this game is going to be called when it reaches our sunburnt shores.

Regardless, the mix of vehicular action and on foot adventures, combined with a beautiful game engine, is bound to be a hit with GameCube owners. Even though it is based around a bunch of cutesy animal-human hybrids, like most GC games, the frenetic pace of the action should see it appealing to those above the age of seven. Alongside Metroid Prime, this looked to be one of the hit GC titles at E3, hinting that it should do well when released.

World of Warcraft



If you thought you didn't have much of an idea of where World Of Warcraft was headed, try being the developer. Apart from showing us the luscious game engine, it had about as much information regarding this game as there is publicly available information regarding America's secret UFO research laboratory underneath the Grand Canyon.

Considering just how little the developer has nailed down regarding this game, we wouldn't be surprised if this game doesn't ship until 2009. Not that this will deter the rabid Warcraft fans, who regard this game with the same amount of respect as the second coming of Christ. At least we know that when it does ship, it's going to look sexy.

Planetside



Perhaps the most eagerly anticipated massively multiplayer online role playing game cum first person shooter, Planetside is indeed shaping up to be a genre changing title. The vehicles rival the mighty Warthog from HALO for sheer beauty, while the environments aren't far off the heavily vegetated locales of Unreal Tournament 2003. But like most multiplayer games at the show, it was impossible to judge how well the network code is going to run. Considering the immense lag that a battle of several hundred characters creates in turn based combat games such as Everquest, we're still not quite sure how the developer is going to make an online first person shooter work with battles of this scale.

C&C Generals



Like almost every other game at E3, this game uses a spoooge-tastic new 3D engine to present the onscreen action. During the demo we saw a dam being shattered, sending a wave down a river and taking out any units who happened to be sun baking on the riversides in its wake. Then a nicely animated nuclear attack took out the main bad guy base, leaving a shiny new car park in the middle of enemy territory. Unfortunately, the game chugged like a locomotive pulling a heavy load up a 90 degree slope. And this was on an Uber system; hopefully optimisation will iron out the frame rate issues - but we wouldn't bet on it. Thank god RTS games don't need silky smooth frame rates to be playable.

Deus Ex 2



Need we say more? Better graphics than the original with real time lighting and shadows, smarter AI, a more involved storyline and a greater number of options for completing each mission – that's Deus Ex 2 for ya. We saw both the Xbox and PC version running, and have to say that the Xbox version looked superior to that of the PC. Like many of the games at E3, really. This is very surprising considering you'd expect this game to benefit most from a zippy CPU.

One of the most impressive features was the new enhanced AI, which often launches two NPCs into a new and random conversation every time you play the game. Now that's what you call life-like AI.

Freelancer



Once we'd got over the fact that this space sim is mouse controlled, and you'll usually be flying your spacecraft on autopilot as you use your mouse to aim at the enemy, we started to understand this game.

It's not so much about aerial combat, as it is about letting the player choose how they want their onscreen persona to evolve. Want to be a space pirate? Go for it. Want to be a freighter pilot? The choice is yours. We're not sure if you can be an Intergalactic pimp, but considering the wealth of other employment options available to you, we'll overlook this small oversight. By the way, just like most of the games that caught our eye, Freelancer also happens to be gorgeous.

Blinx



Yes it's a platformer/3D action game. No, it's not like anything you've seen before. As the developer likes to say, this is a game with four dimensions. As any fan of Stephen Hawking will know, the fourth dimension is that of time, and this game makes you a Timelord. By collecting time manipulation crystals, you are given the ability to rewind, fast forward and pause, as well as a myriad of other bizarre controls. You'll have to start thinking about the puzzles in a totally new manner. It's very hard to explain the gameplay without watching the game in action, but needless to say it is very different to what you're accustomed to. We just hope gamers' heads don't start exploding as they come to grips with it.

Time Splitters II



The original Time Splitters didn't receive a warm welcome in the Atomic offices, looking as bad as most other first person shooters on the PS2. However, TSII is shaping up to be a killer FPS across the three main console platforms. Quite simply put, it leaves the original choking on its empty bullet shells, especially in regards to the visuals department.

We weren't the only ones to think so, judging by the long queues of gamers awaiting a blast in the multiplayer mode. It combines a nice mixture of realistic weaponry with the odd sci-fi boom stick, each significantly different from the rest. Whoever said console first person shooters will always suck seriously needs to see Time Splitters II in action.

KUF Crusaders



Four hundred on-screen characters, each comprised of three to four thousand polygons – this explains Crusaders' absolutely amazing visuals. Watching a troop of armour-clad soldiers charging into a group of Orcs and Trolls in the middle of a forest is a sight that simply has to be seen to be appreciated. Think of the battle scenes from the *Lord of the Rings* movie on a slightly smaller scale, and you've got a pretty good idea of how nice this game looks. In other words, damn schtonkingly fine. The gameplay mechanics appear to be pretty standard Kingdom Under Fire fare, but considering the success of this series it's not much of a complaint to make.

LOTR Two Towers



While only a small section of this game was on display, it was hard not to be impressed by the visuals the developer had managed to squeeze out of the ageing PS2 hardware.

Especially noteworthy were the weather and dirt splash effects, as were the number of detailed units on screen at one time. It looks to be a fairly standard third person hack and slasher, but boy does it look sweet.

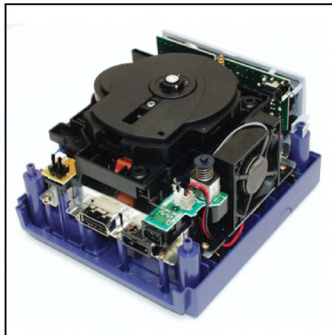
The fact that it's based on the *Lord of the Rings* license guarantees instant success. Slicing and dicing through Orc jugular veins has never been as much fun as it will be in this game, provided the gameplay has the same depth as the stunning graphics. ○

THE GUTS OF THE GAMECUBE

Daniel Rutter's 'getting to know you' routine includes more prodding and poking than is allowable under the Geneva Convention. The poor little GameCube didn't stand a chance.



▲ Outside, the 150 by 110 by 161mm GameCube doesn't look as if it has enough room for a whole lot of gbllets. Inside the little console, though, Nintendo has managed to pack in a lot of processing power.



▲ With the rear panel removed, there's a clear view of the fan/power switch module. The 'Cube's single cooling fan sucks through the console over a big heat sink on the mainboard. You can also see the sound and video output connectors on the back of the mainboard.

Between these two connectors, the GameCube offers the usual composite and Y/C (S-Video) output, as well as component video [Y/Cr/Cb] for connection to fancier video gear. You get a plain three-RCA-plug composite video and stereo audio lead with the console; the other leads, and an RF modulator for use with old TVs, are options. The 'digital' output socket also lets you connect an optional 'D Terminal' cable, well, to Japanese GameCubes at least, because that cable's only useful with Japanese HDTV gear. There's no official way to connect RGB hardware, like a normal computer monitor, directly to the GameCube. GameCube-to-SCART cables are available from places like the previously mentioned Lik Sang (www.lik-sang.com) though, and PAL GameCubes are supposed to support RGB. Nintendo hasn't said anything about it yet, as I write this. If you want digital surround sound, the GameCube doesn't have it. There's no S/PDIF output, just analog stereo. GameCube games can still do multi-channel audio, via plain old analog Dolby Surround or the superior but not widely supported 5.1 channel Pro Logic II.

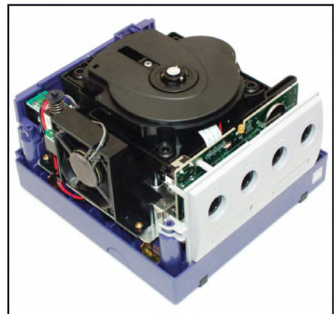


Getting inside

If you want to open your GameCube you'll need an external star screwdriver, commonly known to console-hackers as a 'GameBit'. All of the screws inside the console are Phillips head, but the four that hold the lid on are external star.

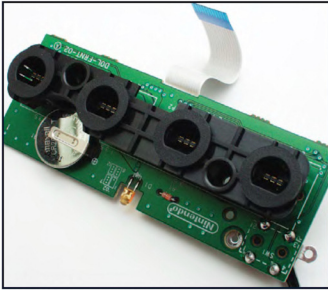
The holes down which these screws lurk are wide enough to fit a hex socket driver, so you can use an external star hex bit. Here in Australia, Jaycar Electronics (www.jaycar.com.au) sells one that fits the 4.5mm GameCube screws perfectly – it's catalogue number TD2030. It costs \$22.50, but that's still cheaper than a dedicated GameBit driver.

The GameCube controller is held together with small tri-wing screws. You can pay for a driver to suit them if you like, but you can also wrestle tri-wing screws out with a flathead driver.

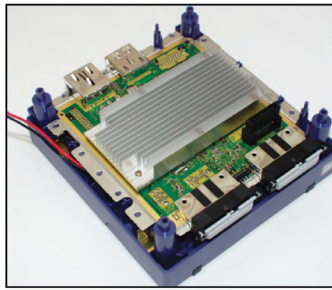


▲ Take the lid off and the tight-packed works are revealed. The disc reader assembly at the top looks like a normal optical drive mechanism, but it'll only read the special 1.5 Gigabyte three-inch double layer pseudo-mini-DVD GameCube discs. If you could physically fit a normal DVD into the GameCube then the drive could probably read the data on it, but as there's no DVD playback software for the GameCube, that'd be where the fun stopped. If you want a GameCube that plays DVDs, Matsushita (Panasonic) makes the 'Gamecube Q', an enlarged Japan-only widget that does exactly that. Gadget-hounds can buy one, pre-modified for US and Japanese game compatibility and multi-region DVD playback, from Lik Sang (www.lik-sang.com) for \$US499.





▲ The controller socket board has the power LED on it, and the BIOS backup battery. It connects to the GameCube mainboard using the only ribbon cable in the whole console – the other major components use a simple vertical plug-and-socket connector system. As well as standard controllers (including Nintendo's optional wireless 'Wave Bird' controller), the front ports are where you plug in the optional Game Boy Advance Connector Cable, which lets you use a GBA for additional game info displays and as another controller.



▲ With the drive assembly and controller sockets removed, you can see the hefty heat sink over the processor, graphics and RAM chips on the mainboard, and the two connectors for the four megabit, 59-save-location memory cards. The memory card slots can also accept a 64MB Secure Digital (SD) Card adaptor, which hasn't yet been released. SD Cards have the same minuscule form factor as MultiMediaCard (MMC), but they include copy control features.



▲ The biggest, and most important, chip on the mainboard is the 'Flipper' integrated graphics processor. It's got ATI stamped on it, but it was designed by ArtX, a company that ATI bought.

Flipper is an everything-chip: it does motherboard interface and glue-chip tasks as well as graphics, and also has a 64 channel Macronix Digital Signal Processor built in for audio duty. About half of Flipper's transistor count is taken up by what Nintendo describes as 'approximately' two megabytes of frame buffer/Z-buffer SRAM and one megabyte of texture cache SRAM.

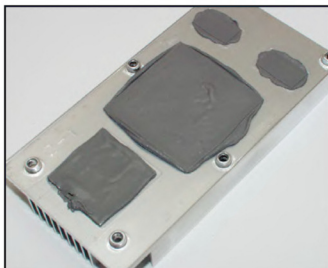
Flipper only runs at 162MHz and isn't a fill-rate monster, but this is a console made for normal TVs, so it doesn't need to push more than 640 by 480 pixels. Flipper supports the usual laundry list of 3D rendering features (including anti-aliasing, by the way), and allows the GameCube to manage 6 to 12 million real-world polygons per second. That makes it some 60 to 120 times as fast as the N64.

To the left of the Flipper are three solder-pad bridge points, two of which are labelled 'R5' and 'R6'. On our Aussie review unit, the R6 pads are bridged with a surface-mount resistor (of value zero ohms – it's a wire bridge that looks like a resistor), and the R5 ones are open.

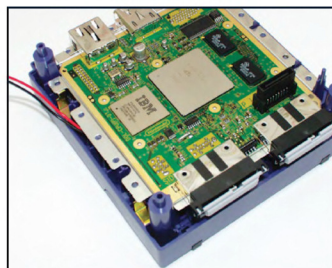
This matters, because Nintendo is doing the same thing with the GameCube that it did with the N64 – there are Japanese, US and European versions, and games are zoned to match. Japanese and US GameCubes are basically the same thing, and you can turn them into dual-zone units by putting a switch across R6. That seems to be the deal, anyway; some sources talk about switching R5 to turn US systems into Japanese ones.

Nobody has a clue about European ones yet, though, because as I write this nobody can buy them. Making a PAL GameCube work with software meant for NTSC systems is unlikely to be as straightforward.

By the time you read this, info on modding European GameCubes is likely to be all over the Web. Check ye the *Atomic* forums, and the [uk.games.video.gamecube-faq.com](http://www.games.video.gamecube-faq.com) FAQ at www.gamecuber.com/faq.



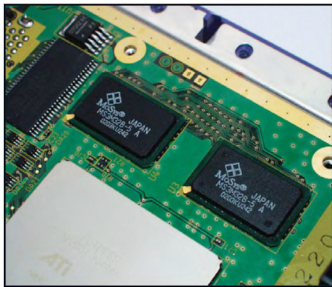
▲ There are thick pads of semi-solid thermal interface goop between the heat sink and the chips. A 39 watt peak power rating (3.25 amps, from its 12 volt power brick; yes, you could run it from a car battery), means that the chips don't run hot enough to need monstrous cooling.



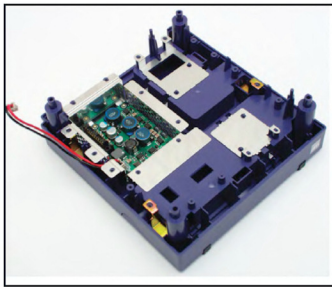
▲ With the heat sink removed, you can see the magnificent entirety of the little mainboard. There's no wasted space, no empty pads; what looks like an empty connector area at the top of the board in this picture is actually the reverse side of one of the expansion connectors.



◀ The GameCube's CPU (or 'Multi Processing Unit', as Nintendo calls it) is IBM's 'Gecko' chip, running at 485MHz from a 162MHz bus. It's based on the PowerPC 750Cxe, which Mac users know as the G3. Pre-release GameCube specs suggested that the CPU would run at only 405MHz, but its speed was boosted by another 80MHz to compensate for lower than expected graphics chip speed.



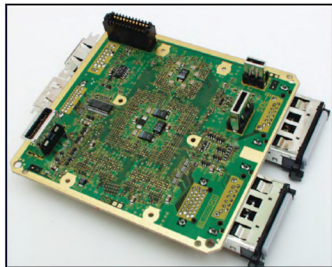
▲ Main memory is two 12MB MoSys '1T-SRAM' chips with the same 3.2 billion byte per second bandwidth as the Rambus RDRAM the PS2 uses, but the 1T design allows that bandwidth to be genuinely accessible for any operation. The Cube also has 16MB of slower 'A-RAM', used mainly as an audio buffer, but also other functions such as disk caching, to make the Cube feel like a cartridge-based console.



▲ With the mainboard removed, there's not much left. The little circuit board is half of the power supply; it takes the power brick's 12 volt input and generates the other supply rails. The two-wire cable coming out of this board goes to the fan/power switch module; everything else is connected via another vertical plug. Most of the base area that isn't full of power supply is taken up by the two expansion bays.



▲ The top of the controller board doesn't have any super surprises, beyond its unusual – but comfortable – layout.



▲ The connectors for the expansion bays protrude from the bottom of the GameCube mainboard. The larger of the two bays will be able to accept a 56K modem or broadband adaptor, when Nintendo releases them. Nothing that can plug into the smaller bay has been announced yet, but its parallel interface is quite fast enough for a hard drive.



The GameCube isn't an amazing ground-breaking earth-shattering product, but it's a very well engineered one. Nintendo hasn't tried to make a Home Entertainment Nexus or a New Digital Religion; it has just made a next-generation console to take the fight to the PS2 and Xbox. The GameCube's specs aren't particularly remarkable, but they're perfectly adequate.

Physically, the GameCube is neat and tidy and nifty; even if you're *not* poking around inside, it makes the PS2 look a bit porky and the Xbox look like a positive boat anchor. Of course, the Cube can't play DVDs or audio CDs like the Microsoft and Sony consoles, and neither does it offer digital surround sound. Or, for that matter, neat and simple un-scan-converted VGA output, but only the poor old Sega Dreamcast offered that.

The Cube's cheaper than the PS2 and Xbox – its suggested retail price is \$329 – but that advantage will fade into insignificance pretty quickly if you build up a game library. If all you care about is raw hardware performance, the Xbox is a fairly clear winner over the PS2 and GameCube, although it's difficult to compare the PC-based Xbox architecture with the PS2, in particular. But gaming in general, and console gaming in particular, is about the software more than the hardware. Nintendo has a sterling reputation for game quality, and there's a decent starting line-up of games for the Cube. Accordingly – let battle commence!

URLS:

Nintendo Australia: www.nintendo.com.au

Nintendo's GameCube site:

www.nintendogamecube.com

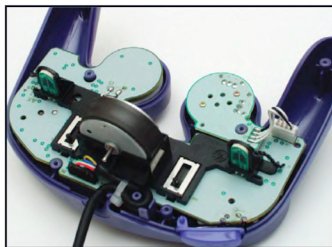
uk.games.video.gamecube FAQ:

www.gamecuber.com/faq

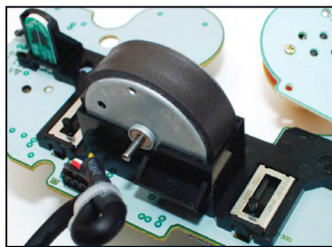
Lik Sang: www.lik-sang.com

Jaycar Electronics: www.jaycar.com.au

(driver bit for opening up GameCubes is catalogue number TD2030)



▲ Lift the lid off the GameCube controller and you find a couple of unusual features. There's only one 'rumble' motor, versus the two in PS2 and Xbox controllers, but it's a biggie. It doesn't have an externally visible unbalanced rotor, like the usual kind of rumble motor, but it definitely still works. There's a slider-pot on either side of the rumble motor and each pot connects to one of the controller's unusual long throw analog shoulder buttons. If you push the shoulder buttons all the way they click a separate digital switch.





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MP3 vs WMA vs OGG

Compressed audio formats are like GPU chipsets – there are lots of them out there, but three stand out from the crowd. Ashton Mills makes some noise.

Not so long ago, the idea of collecting CD music on a PC was a little far fetched. There was no incentive to store music on the PC, as music ripped from CDs would take up 50MB for an average song when stored complete in WAV format. Why bother, when you could simply play a CD in the CD-ROM drive?

Then came Fraunhofer's compression algorithms, later to be incorporated into the MPEG Layer III (MP3) format, capable of compressing a 50MB WAV file to just 3MB. This format alone sparked the music sharing revolution and changed the face of music (to be incredibly clichéd) forever. Around 35MB of MP3s for an album is infinitely easier to share than 600MB of WAV files.

Unfortunately, MP3 is a lossy format (see sidebar 'What do you want to lose?') and while it left most of the world suitably impressed for the quality of sound achieved with such small file sizes, audiophiles were left wanting more. So the competition of producing high quality sound from lossy compression began. Today there are literally loads of compression formats available. The most popular is still MP3, followed by WMA, which has started to garner a following among media companies for its inbuilt copyright protection. Ogg Vorbis, an upstart open source license-free solution to MP3, has managed to build quite a

reputation as the main alternative to MP3. And so, lo, we present you a competitive comparison of these three major formats.

MP3

The first and no longer the best, the algorithms that make MP3 what it is first saw the light of existence during the late 1980s at the Fraunhofer Institut in Erlangen, Germany. One Professor Dieter Seitzer, who was working on a project known as EUREKA project EU147 Digital Audio Broadcasting (DAB), was largely responsible for developing the algorithms that would later become a part of the ISO MPEG Audio Layer-3 standard.

After MP3s achieved notoriety, Fraunhofer patented its technology and insisted that any project using them must pay royalty fees. This killed a lot of MP3 encoding projects dead in the water, and actually sparked the development of Ogg. It is this royalty payment that is the reason you can count the number of free MP3 encoders on one hand, specifically between your pinkie and index finger.

Quite ironically one of the best and well-known encoders/decoders for producing high quality MP3s is the open-source project LAME (the name is a recursive acronym for 'LAME Ain't an MP3 Encoder'). Initially launched as a patch

against the original ISO MP3 demonstration source, which had it legally standing on dodgy ground for a while, all remnants of the original source are now replaced by LAME code. That one the best MP3 encoders available is free is a fitting testament.

Judging the quality of the sound really does depend on the encoder you use, as the vast variety of MP3 encoders available attempt to continually improve the format without breaking compatibility with players.

It often revolves around fine-tuning the encoders to specific bitrates, so while variable bitrate encoding (VBR) is available with some encoders and helps to produce smaller files, MP3 really excels in constant bitrate (CBR) encoding.

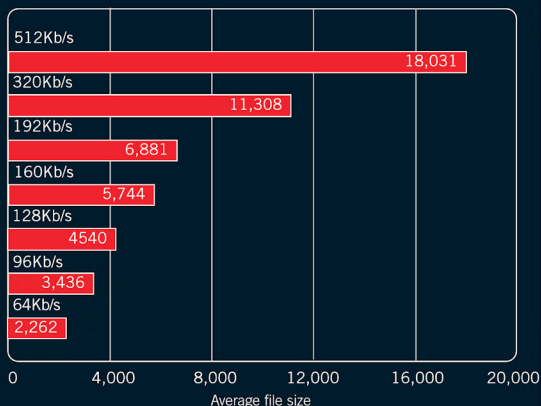
Ultimately MP3 has its limits, and has, technically, already been superseded by formats such as WMA and Ogg. The main reason it's still around today is by virtue of the immense popularity. Long live the first!

Features: CBR and VBR encoding, track/author/song information (ID3 tags), two channels maximum (stereo), great quality at high bitrates

Bitrates: 8-320Kb/s, 32-48KHz

Toys: Plenty of encoders/decoders available, Google it! Recommend WinAmp (www.winamp.com) for audio decoding, and LAME (www.mp3dev.org/mp3) for audio encoding.

Bitrate vs average file size on a sample 50MB WAV file



RIGHT: The average file size after compression of a 50MB WAV file. Each file format compressed to within 20-200KB of each other at each bitrate. Ogg was always smallest, followed by MP3 then WMA. Ogg is the only format to support 512Kb/s, and only Ogg and MP3 support 320Kb/s.

What do you want to lose?

MP3, WMA and Ogg are lossy compression algorithms. That is, they perform so well at the task of reducing large WAV files to compact compressed audio files because data is sacrificed – lost to the void – during encoding.

Lossless compression is, quite literally, where no information is 'lost' during compression. Clearly this is a superior method for achieving the highest quality sound, but understandably encoded files will be nowhere near as small (around 2:1 as opposed to MP3's average of 10:1).

Two popular lossless formats you can explore are Shorten (www.softsound.com/Shorten.html) and Flac (flac.sourceforge.net).

WMA

Microsoft started working on its Windows Media Audio format when it realised the potential of MP3 and wanted a piece of the pie. Versions of WMA up to 7 were generally quite poor for audio quality, but the current version 8 is more than a match for MP3. In fact, according to Microsoft's claims, WMA can achieve the same level of fidelity in 64Kb/s that MP3 does in 128Kb/s. This isn't quite true (though clearly this is a subjective thing) but WMA does perform far better at and below 128Kb/s than MP3, creating not only higher quality but also consistently smaller files. For this reason WMA is an ideal format for portable music players. This is not a coincidence. One of the main features of WMA is that, of all the audio formats available, it is the only one to include 'digital rights management', aka copyright protection. DRM provides a framework to make WMA files unplayable on machines that don't have the correct license. This, combined with Microsoft's intention to excel in audio quality at low bit-rates, clearly makes WMA the preferred compressed audio format for commercial interests that want to make use of (and money from) portable media, such as the RIAA.

Unlike MP3, no license fees are currently required for WMA encoders, and Microsoft provides an excellent encoder bundled in Media Player with XP. Also unlike MP3, WMA was designed with streaming in mind and so it is a popular choice for Websites and Internet radio.

Features: CBR only, track/author/song information, Digital Rights Management, two channels maximum (stereo), great quality at all bitrates (especially the case for low bitrates)

Bitrates: 8-192Kb/s, 8-48KHz

Toys: Check out

www.microsoft.com/windows/windowsmedia/for_encoders/decoders. WinAmp also plays WMA files.

Ogg

Funny name, great codec. Ogg Vorbis is a fully open, non-proprietary, patent and royalty free, general-purpose high quality compressed audio format – so says the homepage (www.vorbis.com).

As stated earlier, Ogg Vorbis started as a response to the patenting of MP3 to provide a free, open-source alternative that wouldn't require license

It is currently still under development but in final beta stages. In its earlier days it didn't offer much competition to MP3 or WMA, but the latest Beta 4 release has proven itself to be perhaps the highest quality lossy audio format currently available. Like WMA it also produces smaller files than MP3.

Just like WMA, Ogg was designed specifically to excel as a portable media format, whereas MP3 sort of fell into the role and was later patched to add features such as song and track information. To this end it has some unique features, such as *bitrate peeling* – a nifty method where the bitrate can be reduced on the fly without re-encoding. Given Ogg is also a streamable format this means it's possible to use it for tasks such as Internet radio where the bitrate of the stream will be adjusted in real-time according to available bandwidth – no more pauses or skipping due to clogged bandwidth. If you start a hefty download, the Ogg player will reduce the bitrate of the streaming media to compensate, and raise it again when the download is complete. Like MP3, Ogg has also been used as the sound format in some games, so you may have already heard the format and not realised it.

Features: VBR only, track/author/song information, bitrate peeling, multiple channels (more than two), license-free, open-source, high quality at all bitrates
Bitrates: 64-512Kb/s, 44.1-48KHz
Toys: Check out www.vorbis.com for an extensive list of software that supports Ogg. WinAmp also supports Ogg through a plugin.

Conclusion

Listening is, as always, subjective. Which of these formats sounds best is up to your ears, but each has its strengths. MP3 doesn't match up to the quality of WMA or Ogg except at high bitrates (at least 192Kb/s), but then the increased file size totally defeats the purpose of using compression in the first place.

It is, however, supported everywhere. WMA and Ogg excel equally at low bitrates up to and including 128Kb/s, but Ogg supersedes WMA past this. Ogg, however, is still in development and may be prone to bugs.

If you were to start encoding your entire music collection now, WMA or Ogg sound like (pun intended) they would be the best formats to do justice to your musical tastes!

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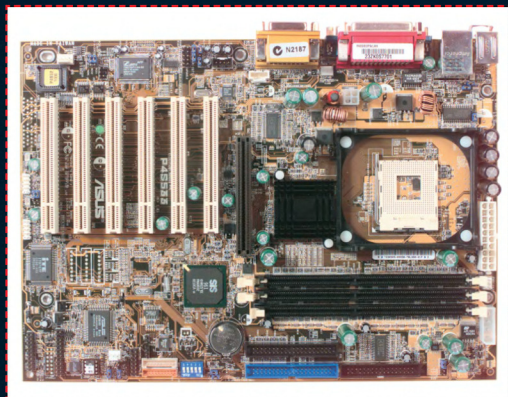
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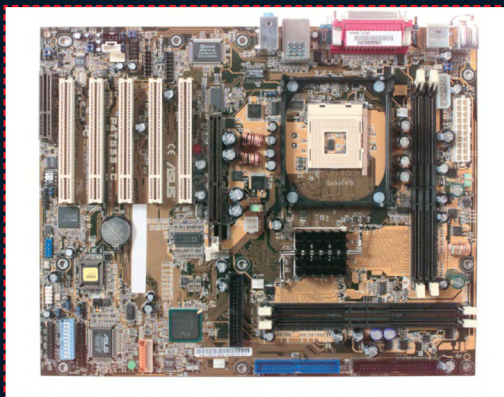
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533 times the fun

Intel has finally boosted the Pentium 4 to respectability, so John Gillooly grabs a fistful of RAM and looks for the perfect chipset to go with it.

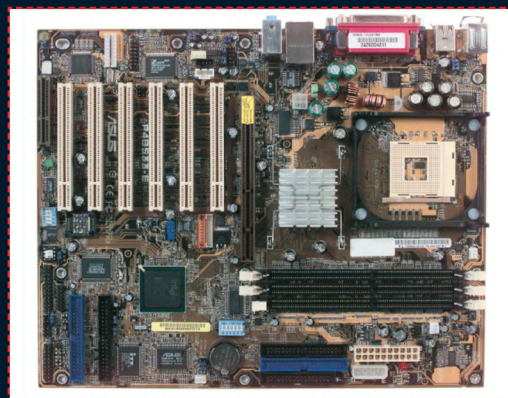


ABOVE: The ASUS P4S533, which uses the SiS645DX chipset.

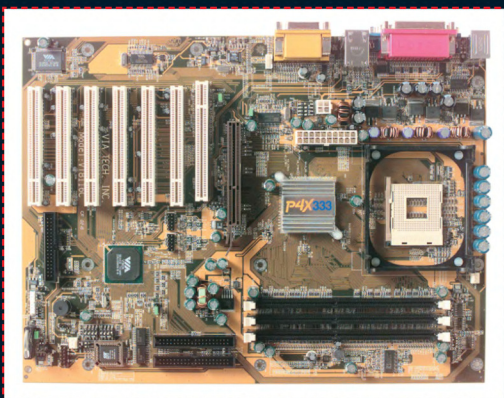


ABOVE: The ASUS P4T533-C, based around the i850E chipset

atomic
HOT



ABOVE: The P4B533-C, based around the Intel 845E chipset



ABOVE: The very Hot VIA P4X333 reference board.

Intel has historically held the desktop performance crown, heck, it practically invented the notion of overclocking as a semi-mainstream pursuit when it unleashed the Celeron 300A on an unsuspecting and cash deprived yet performance hungry public. But things have changed over the past few years: AMD has been having remarkable and highly deserved success with the Athlons, which combining easy tweekage with performance that could blast the competing processors out of the blue.

It was into the burgeoning AMD-friendly environment that Intel made the first big step in years and introduced the Pentium 4, with the cutely named 'NetBurst' micro-architecture. And the Pentium 4 was not met with the open arms that would once have been expected of such a new and exciting development from the CPU powerhouse. The reasons were varied, from the forced pairing with the then prohibitively expensive and still esoteric RDRAM under the i850 chipset, to the sudden bursts

made when AMD bumped the Athlon's already potent Thunderbird core up onto an effective 266MHz Front Side Bus.

Back in the first issue of *Atomic* we took the 1.2GHz Athlon head to head with the 1.5GHz P4, and tried to comprehend the fact that such a huge speed difference on paper didn't directly translate to benchmark results, with the Athlon besting the P4 in many of the tests. This problem plagued the original Willamette core of the Pentium 4 for the rest of its life.

Jump forward to now and the picture is definitely changing. Intel has managed to revitalize the P4 by playing two of the oldest tricks in the book: firstly by doubling the L2 cache from 256KB to 512KB as part of the Q.13micron die shrink that is known as the Northwood core, and then by playing the latest card, cranking up the Front Side Bus... ah, the symmetry...

When the Willamette Pentium 4 was launched much was made of the Quad Pumped nature of its bus, so much so that it was almost never referred to by its 100MHz speed, but rather by the effective 400MHz that it delivered. Intel has now bumped this up to a 133MHz bus running at an effective 533MHz, turning to look over its shoulder as the Athlon XP starts fading into the distance.

It seems Intel has finally regained the pure desktop performance crown with the 533MHz FSB Northwoods, however the Athlon XP still stands as the best bang for your buck CPU. This is not to say that Intel will be able to relax. AMD has its first chance to become a true innovator in the mainstream CPU market with the upcoming Hammer x86-64 CPUs, which will most likely push AMD back into the limelight, but for now Intel has the lead.

The Northwood core did not require new chipsets to take advantage of the noticeable performance boosts that it gave, however this changing of the Front Side Bus speed does necessitate new chipsets.

So, taking this to heart, we have lined up Intel's two performance chipsets, the RDRAM based Intel 850E and DDR266 based i845E with the SIS 645DX and VIA P4X333. And rather than just be content with that, we have pulled out as many combinations of RAM speeds as we can cram into the boards.

R-D-R-R

Intel learned a valuable lesson after the poor reaction to the original 850 chipset: the marketplace does not want to be sluggish with an exotic, expensive, proprietary type of system RAM. It took a long, long while for the price of PC800 RDRAM to even approach DDR RAM. Salvation for us users came in the form of the i845 chipset, which first added support for performance crippling PC133 SDRAM and then eventually for PC2100 DDR RAM (DDR266) with the i845D variant.

Surprisingly enough, the 533MHz FSB P4s were launched alongside the updated i850E chipset, which lacks support for the new PC1066 RDRAM. This new speed grade of RDRAM complements the 533MHz FSB in the same way that PC800 RDRAM complements the 400MHz FSB. However, this hasn't stopped mobo manufacturers from adding support for PC1066.

Keep this in mind before you grab your existing PC800 RDRAM and search out a new CPU and mobo. The i850E needs newer 40 nanosecond RDRAM to function, something that is still rare at the time of writing. In fact, even Intel was unable to supply 40 nanosecond PC800 RDRAM with the CPU, instead providing us with 45 nanosecond RDRAM that was tested for 40 nanosecond operation.

The new Intel way

Over the next months the most common of Intel's new chipsets will undoubtedly be the i845E. This is an enhanced version of the i845 chipset that adds both support for the 533MHz FSB and Intel's new ICH-4 South Bridge (for compatibility in the corporate environment the i850E uses the older ICH-2 South Bridge from the i815E days). This major feature of this new South Bridge is support for six USB 2.0 ports, rather than the USB 1.1 support found on the ICH-2. Due to Intel's focus upon the upcoming Serial ATA technology, the ICH-4 does not bother with support for ATA133, sticking with ATA100 as the maximum transfer speed supported by the IDE channels.

Just as Intel was slow to introduce support for DDR RAM, largely due to concerns about the memory's specifications, the i845E stays with support for DDR266 and doesn't make the foray into the much newer DDR333 memory.

The Kraken awakes

Taiwanese chipset manufacturer, SIS, has only recently made its presence felt as a maker of performance chipsets. After being first to the punch with DDR333 for the Pentium 4, in the form of the SIS 645 chipset, it has followed up with the slightly updated SIS645DX chipset, which adds support for the 533MHz FSB to the SIS 645. It has recently become public that SIS has a licensing agreement with RAMBUS and should be hitting the market with an RDRAM chipset somewhere in the not-too-distant future. According to the latest buzz from the Atomic spying's contact inside RAMBUS, this chipset should kick the i850E all over the performance paddock.

The Dark Horse

While VIA is a household name among performance enthusiasts, thanks largely to the leaps and bounds made in Athlon performance that have come from its chipsets, it is very much persona non grata in the Pentium 4 arena. Intel has never granted a license for VIA to use the P4 bus, and this has been the subject of ongoing global legislation for some time now. Of course, this did not stop VIA from releasing the P4X266 DDR chipset for the P4 last year (although it did stop many first and

second tier mobo makers from adopting the chipset), and it has certainly not stopped VIA from unveiling its new flagship, the P4X333.

This chipset is special indeed, not only adding support for the 533MHz FSB and DDR333 but also 8x VLink between the North and South Bridges (running at 533MHz), USB 2.0, ATA133 and the first support for AGP 8x seen in the marketplace.

Money on the table

They all sound rather fancy don't they? But what we all really want to know is how well they perform. In order to find this out we dragged examples of each of these chipsets into the Atomic Labs and gave them the thrashing of a lifetime. Each board has been tested using both a 400MSB FSB Northwood and a 533MHz FSB Northwood, both running at 2.4GHz. Not content with that, we have also crammed several speeds of RAM into the boards in order to find out just where the performance sweet spots lie.

For testing we have used an i850E powered ASUS P4T533-C, and i845 powered ASUS P4B533-C, the SIS 645DX bearing ASUS P4S533 (all supplied by CASSA Australia, www.cassa.com.au) and straight from the dark horse's mouth, the VIA P4X333 reference board (supplied by VIA www.viatech.com).

We've used 512MB of Samsung PC800-45 RDRAM (tested for 40ns operation) and 512MB of Corsair XMS3200 DDR333 RAM (capable of running at the aggressive 2-2-2 CAS settings).

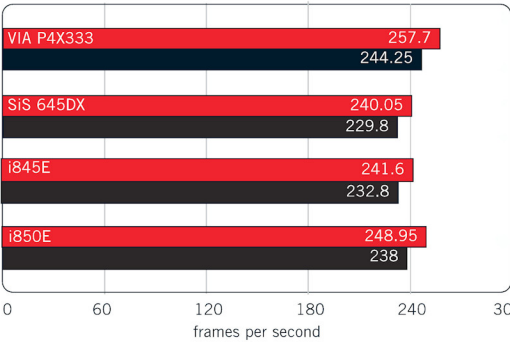
Thankfully, the ASUS P4T533-C allows us to run the PC800 RDRAM at PC1066 speeds, despite the i850E not officially supporting PC1066, and we have tested the board with both RAM speeds. The i845E lacks any support for DDR333, so the ASUS P4B533-C has been tested solely with the Corsair RAM running at 266MHz. The ASUS P4S533 and the VIA P4X333 support DDR266 and DDR333, so the boards have been tested with the Corsair RAM running at both speeds.

We tested using SYSmark2002, Quake 3: Arena at CPU settings and PCMark2002. We are yet to be convinced that PCMark2002 gives meaningful results, so we have only published SYSmark2002 and Quake 3 ones. Both of these have a hunger for memory bandwidth, so they are highly appropriate for testing the performance of competing chipsets.

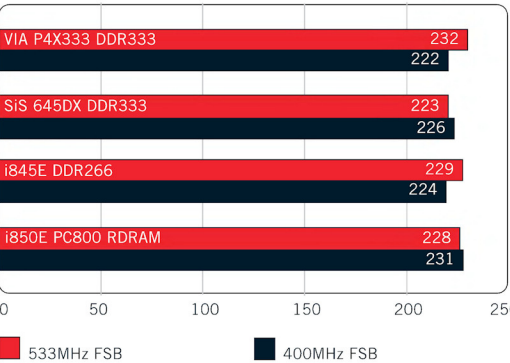
Intel is still saying that RDRAM is the performance RAM solution for the Pentium 4, and the results for the i850E chipset with PC1066 RDRAM demonstrate this. In SYSmark2002 most of the benchmark results sit around the 230 mark, with the two exceptions being the SIS 645DX chipset, sitting behind the others with both RAM speeds, and the i850E with



Quake 3: Arena - CPU Settings



SYSmark2002 Rating



PC1066, which leads the pack by a small margin with a rating of 240.

This advantage is largely due to the fact that PC1066 is the only RAM currently available that runs at the same effective speed as the CPU. All the other chipsets should be bottlenecked by the RAM, reducing some of the 533MHz FSB's advantage, however when we compare the 400MHz FSB to the 533MHz FSB, we see that the boost in SYSmark2002 due purely to FSB speed is only evident on the VIA P4X333 reference board.

Quake 3 also shows the superiority of the i850E with PC1066 RDRAM, with the 270 frames per second the highest we have seen in this benchmark. However, the VIA P4X333 managed to perform 7% faster than the nearest DDR chipset, the i845E, with the SiS645DX showing that it is no longer the performance option it was.

Unlike SYSmark2002, Quake 3 demonstrated the performance gain seen by the faster Front Side Bus, with a consistent 5% increase seen when changing to the 533MHz FSB across all chipsets.

The battle continues

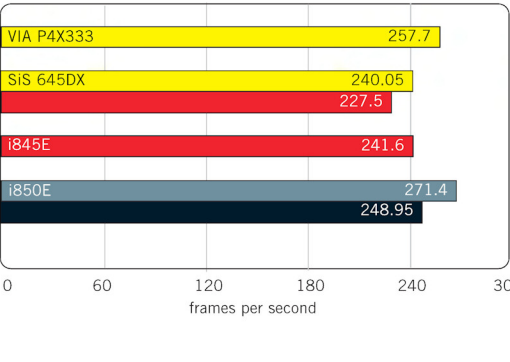
While there are definitely no slackers in the P4 chipset race, two chipsets manage to stand out. The i850E with PC1066 RDRAM is the solution for those who want blinding performance with no care for cost or features, but it is hampered by the use of the older ICH-2 South Bridge. However, the real shining light in our eyes is the VIA P4X333, which combines an amazingly fast DDR controller with the most advanced featureset currently available.

Unlike the Athlon, the Pentium 4 is able to take full advantage of the bandwidth that DDR333 gives, a gift that VIA takes full advantage of with the P4X333. Couple this with the support for AGP 8x (which will become mainstream when the next generation DirectX 9 compatible graphics hardware hits), the six USB 2.0 ports that the i850E sadly lacks and the use of 8x V-Link between the North and South Bridges and we have a chipset with more staying power than the others currently on offer.

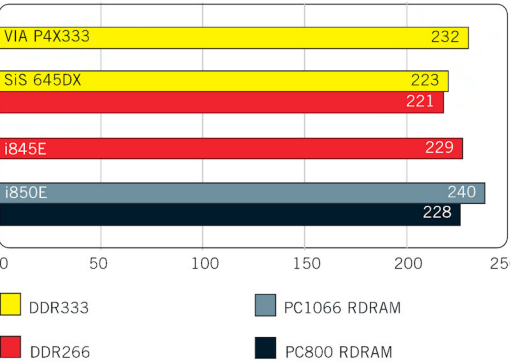
The only major issue is the scarcity of P4X333 boards on the market, thanks to Intel and its litigious ways. VIA has gone some way in rectifying this through the formation of VPSP (VIA Platform Solutions Division), which is VIA's in house motherboard brand formed mainly to overcome the lack of P4X mainboards by marketing VIA brand motherboards (the production of which is outsourced to other manufacturers). Boards should also be available from some of the smaller motherboard manufacturers, just none from the big guns.

Of course, we cannot discount SiS regaining the performance crown sometime soon. Its impending RDRAM chipset will undoubtedly add features such as AGP 8x, and should perform like an i850E on steroids, but for now the performance crown rests with Intel's 850E. However, with the mix of the fastest DDR performance on the face of the planet, an unsurpassed featureset and a stickin'-it-to-the-man attitude the VIA P4X333 is all-round champion. □

Quake 3: Arena - CPU Settings



SYSmark2002 Rating





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Matrox Reloaded

Parhelia takes the most significant leap forward for video since the original 3dfx Voodoo graphics. James Wang digs deep into the future, which is now.

Prelude

My system tray clock blinked: 3AM. Surfing the MURC (Matrox Users) forums till morning has fully integrated into my sleeping cycle. Huge threads, over nine pages long fill the Matrox 'Crystal ball' forum, where speculation and rumours on Parhelia are discussed by fans with optimism and exuberance. Everyone is a happy face here, there is no name calling, no company bashing and no flame wars — just energetic discussion and the occasional tease by proud Matrox fans: 'I thought all GeForce cards have NV-blur?'

This small and harmonic virtual society was largely unnoticed by the outside world. I followed it closely, each night noting the changes, reading feedback from Parhelia beta-testers and secretly smiling as I admire this community against all the doubt of the outside world. Then, on 14 May 2002, Parhelia emerged from the crisp blue skyline of Montreal, Canada, just as Matrox predicted.

Out of the blue

Matrox is a privately held company founded in 1976 and a true survivor of the graphics industry. It has been producing graphics longer than NVIDIA and ATI's history put together, and its name is held in the highest regard in the business market, a symbol of professionalism and quality. However, among gamers Matrox has always carried a sense a curiosity: there are the few who stand firm on Matrox's quality and there's the majority who view the G series of cards with scepticism. Now, everything is about to change. Parhelia will be the first card to bring back some real charm into a once vibrant industry.

Parhelia - 512

In case you've been buried under a cave, you should know that Parhelia is Matrox' new Graphics Processing Unit (GPU) designed to compete in the enthusiast gamer and professional market. Parhelia packs more than 80 million transistors into a tight 0.15-micron manufactured chip. It'll be the first GPU to hit the market using a 256-bit DDR memory interface (current high-end GPUs use a 128-bit DDR interface) — a dream of many other companies but due to high costs, it hasn't been introduced in the gaming market. By using the BGA memory form factor, Matrox has reduced enough cost to make this technology viable for the mass market. This leap is a non-trivial one: by doubling the external memory bus to 256-bit, Matrox has instantly doubled the raw bandwidth of the GPU. If the Parhelia hits the market in July as currently planned it will be the first graphics card to break the memory bandwidth bottleneck. Those wondering why it's named Parhelia-512 should take a peak inside this monster. While it has a full 256-bit memory interface, its internal bus is twice as wide at 512-bit. This dual bus (2x256) design allows the GPU to simultaneously send and receive data with the outside world with ample bandwidth. The Parhelia feature list is longer than any GPU feature list we've seen to date, and the amount of technology Matrox engineers managed to cram in is simply staggering. For us Atomicans and 3D enthusiasts, there are three features which are nothing short of ground breaking: displacement mapping, 16x fragment anti-aliasing with 64 super sample texture filtering and triple monitor Surround Gaming.

Can you say 'curved surfaces'?

For the longest time, higher ordered surfaces (HOS) was destined to take over and revolutionise 3D. By using curves to represent certain geometry, our game characters would be incredibly smooth, fluidly animated and dynamically deformable. This did not happen. Why?

In order to draw the outline (just the geometry) of a rocky mountain, we have to decide on how many triangles we can afford. The more triangles, the greater the geometric detail. If the hardware we are targeting is powerful enough, we can use a few million triangles and have one helluva mars terrain simulator. The problem is not the CPU, but the fact that our triangles must travel through the AGP port which has a peak bandwidth of 1GB/s. Game developers would love to push more triangles into their scenes but with textures, instructions and other overhead all going through the AGP, they must be careful not to abuse triangle count in their engines. Using higher ordered surfaces, they can use mathematical formulae ($y=x^2$ anyone?) to generate shapes which otherwise would need thousands of triangles (sent through the AGP) to describe. While it all sounds great, designers soon realised they couldn't draw Lara Croft's intimate curves with equations very easily. They could do all the art, have the GPU transform the curves back into triangles and get a very smooth chest but in the end, there were all sorts of problems from pixel cracks — yuk. In an interview with Gamespot, id's Carmack commented: 'When you join two curves together, the vertices wouldn't match up and you'd get pixel cracks.' This is where displacement mapping comes in.

Why it matters	
Displacement mapping	Real time geometry generation
16x fragment anti-aliasing & 64-sample texture filtering	Fast, high quality anti-aliasing & full speed anisotropic filtering
Surround gaming	A revolution in its own right

Displacement mapping

Matrox has been evangelising displacement mapping as a modelling primitive for years. Geometry in displacement mapping is stored as a greyscale bitmap, rather than as vertices or triangles, saving an enormous amount of memory but also creating very detailed geometry. The



ABOVE: Both figures use the same model, with the detail coming from different displacement maps. The images show varying strengths of displacement mapping.

concept behind displacement mapping is ingenious: two triangles and a 128x128 grey scale texture can express terrain that would otherwise take hundreds if not thousands of triangles to describe. First a base mesh of triangles is sent to the GPU along with a displacement map (texture). Upon arriving, the low triangle model is tessellated (cut into many smaller triangles in a uniform manner) to exponentially increase triangle density. At this stage, the GPU conducts a series of texture sampling mechanisms to make sure the displacement map is correctly sampled and matched to the new triangle mesh. Each pixel in the displacement map carries a height value based on its grey scale. By assigning each pixel of the displacement map to each vertex of the tessellated mesh, we give them unique height values. The GPU then moves the vertices to their new height values and a displaced mesh is produced. This process is fairly easy to implement and is already incorporated in one major title, Westwood's *Earth and Beyond*. Displacement mapping is a major step over normal bump mapping which

produces no new geometry and N-patches that can only create smoother models. As a HOS primitive, it guarantees no cracks and a seamless mesh, whereas traditional curves would start tearing away Lara Croft's...

Depth adaptive tessellation

Matrox has also incorporated its patent pending, dynamic level of detail (LOD) tessellation scheme for Parhelia's higher ordered surface engine. Parhelia supports this through N-Patches (such as the Radeon8500) and of course, displacement mapping. Dynamic LOD tessellation does to triangles what mip-mapping do for textures; it computes the workload based on the object's distance from the viewer. As the scene moves further from the camera, the level of tessellation is dynamically tuned down. This cleverly manages performance and image quality. Software LOD is implemented in today's games, but often you will notice polygon popping as the LOD levels change in discrete amounts. Parhelia's hardware implementation uses a floating point (decimal) rather than integer

representation, resulting in LOD changes that are smooth and free from artefacts.

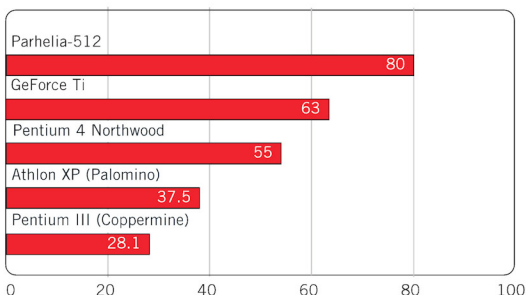
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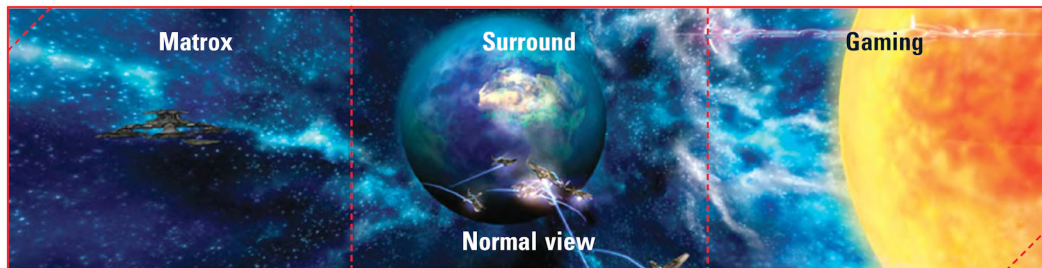
Matrox describes the Parhelia as targeted at the discerning gamer, the kind who tweaks image quality and frame rate to the perfect balance, and really appreciates the fine quality of anti-aliasing and anisotropic filtering. If this is you, then Matrox proudly offers its 16x Fragment Anti-Aliasing (FAA). Before the Geforce4 Ti series, anti-aliasing was usable but not without heavy speed penalties. Due to the NV25's multi-sampling pipeline, anti-aliasing is done in parallel, making it friendlier for the FPS counter. However, if you were to use NVIDIA's top notch 4x S anti-aliasing, the performance would still fall off the cliff by 40-60% depending on the resolution. It does look very pretty, as it incorporates anisotropic filtering to clear up textures. Even though ATI's Smoothvision features programmable sampling patterns, it still suffers the hefty speed penalties from super-



ABOVE: The highly efficient 16x fragment anti-aliasing at work.

Transistor count in modern processors (million)





sampling. Although it supports up to eight samples, ATI has locked it to a max of six in the driver panel, for no other reason than not being able to attain the insane fill rate needed to render an entire scene at eight times to native resolution.

Matrox obviously isn't worried as it offers 16x Fragment Anti-Aliasing (FAA). The trick is that it only works on triangle edges. It makes sense, after all, because why the heck are we burning away bandwidth to AA wall after wall of bland textures (Quake comes to mind)? As triangle edges (fragments) only take up 5-10% of a typical 3D scene, the workload for FAA is much less than typical full screen AA. Parhelia writes non-fragment pixels of a scene directly into the frame buffer. The remaining pixels are the scene edges, on which Parhelia renders at a massive 16 times the native resolution before a blending operation is done. These pixels are then scaled down and written to the frame buffer, producing the anti-aliased image. Texture aliasing is addressed by Parhelia's 64-sample pixel pipeline. 16 texture mapping units really help in anisotropic filtering which cannibalises fillrate. Parhelia will be able to apply 4-tap anisotropic concurrent with tri-linear mip-mapping on single textures with no speed penalty. It seems ATI still offers the best filtering solution with its dynamic 16x anisotropic filter capable of taking 64-samples on dual textures with minimal penalty. We will have to see how Parhelia performs in the real world before making any firm judgements.

Gaming revolution

Parhelia's triple monitor, surround gaming is probably the boldest innovation for ultra hardcore gamers in the history of 3D acceleration. The step in this direction to increase realism is one unattempted by any other tier one 3D company. The fuel behind 3D has always been to create the best illusion of reality, so we can frag our friends and still be friends. Even if we had a photorealistic first person shooter



running on a 21" monitor, it would still seem fake: our minds ('primitive cerebral'-Agent Smith) would refuse to accept the system. This is also why IMAX is heads and shoulders above your local cinema when it comes to reality suspension thanks to its larger field of view (FOV).

By increasing the FOV by three times, Parhelia takes a step toward 3D simulation that cannot be matched by literally 'anything' (effects, shaders, smell generators) you do on a 4:3 aspect ratio monitor. For NVIDIA and

ATI, this is really a blow in the face, as all their PR hyperbole about 'serving the extreme gamer' and 'technological milestones' cannot match the fact that Matrox has pulled something that is light years ahead of their simulation capacity. Yes, it does require you to have three monitors, it is expensive, but it's without argument one of the most iconic representations of Maximum Power Computing. I can already see the controversy this will bring the FPS community: is it an unfair advantage? Will some gamers really think it's cheating? Only time will tell on how this will be received by FPS gamers. For flight/space sim fanatics, this is nothing short of a Godsend. No more clumsily flicking the hat switch to find that flanking Su-27, you'll be able to look around almost like a real pilot. The really good news is Surround Gaming will work out of the box for many top titles. Among them, the Quake3 (Soldier of Fortune II, Jedi Knight), Unreal (UT2003) and Serious Sam engine based titles.

The Parhelia-512 pipeline

The first thing that strikes you when viewing the Parhelia chip is its four parallel Vertex Shader Engines. This shader array can process four vertex streams in parallel, twice the capacity of the Geforce4 and four times that of the Radeon8500 at equivalent clock speeds. Furthermore, this is the first DirectX9, V2.0 compliant vertex pipeline. The benefit of this is that all calculations are done in 32-bit,



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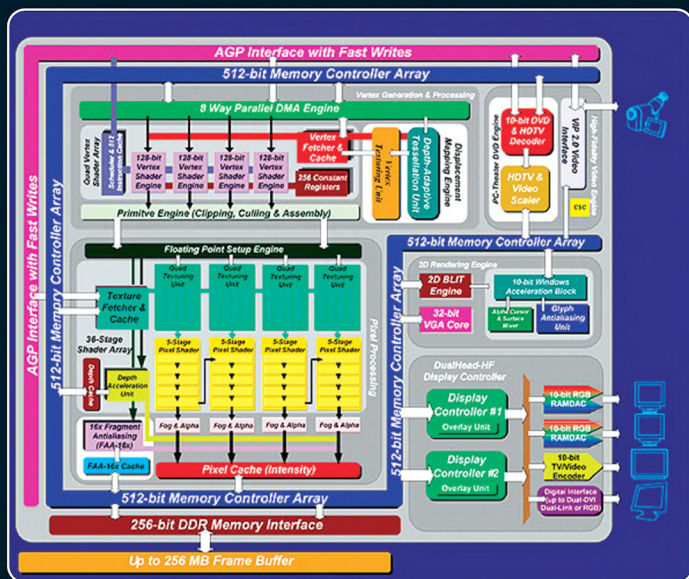
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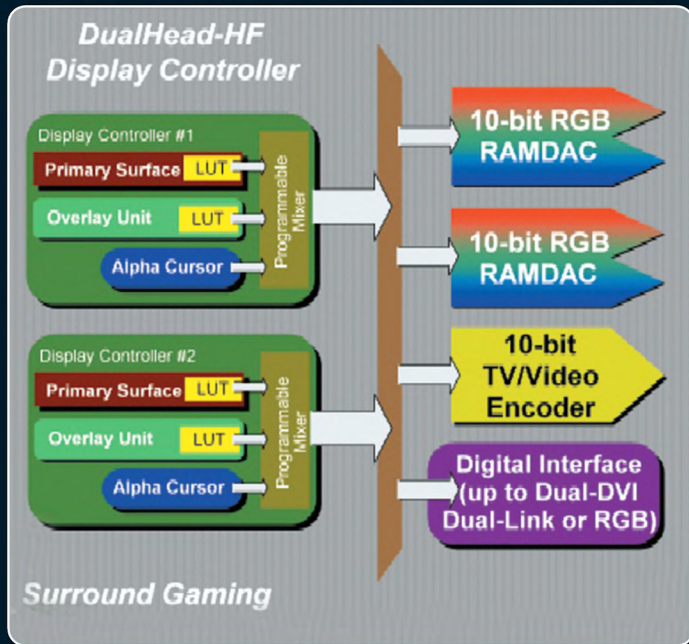
ABOVE: The internal architecture of the Parhelia-512. Of special note is the use of the 512-bit Memory Controller Array, hooked up to a 256-bit DDR memory interface, which will up the cost of the card, but at the same time helps to kill the memory bandwidth problems that plague modern high speed GPUs. It should also be noted that Parhelia will debut with an AGP 4x interface rather than the newer AGP 8x.

floating point accuracy throughout the vertex engine. The 512 instruction cache and 256 constant register keep the pipeline happily fed during long instructions. Matrox has also optimised routes for standard OpenGL vertex lighting models used by current games.

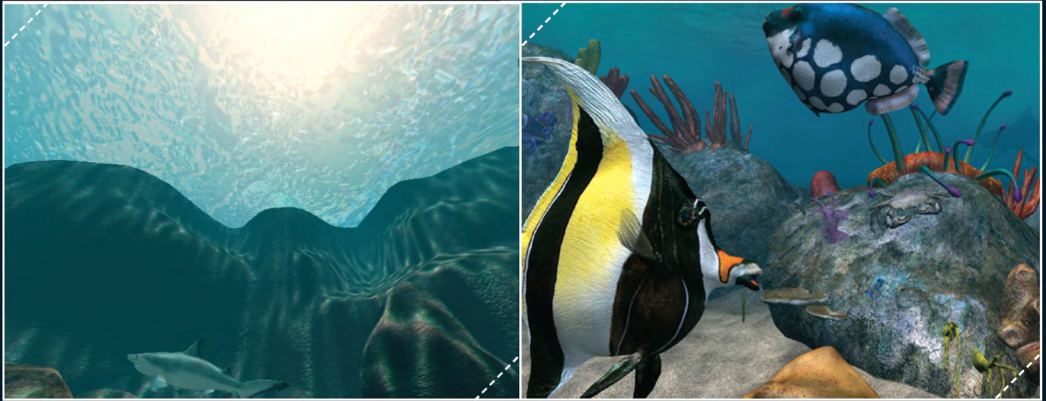
The pixel shader array is somewhat not as advanced — it's compliant up to DX8.1, not DX9. The Parhelia features a version 1.3 compliant pixel shader, which is at the same level as the Geforce4 in terms of compliance, but the Radeon8500 continues to offer higher flexibility in this area. Each pixel pipeline has four texturing units attached, giving the Parhelia single-cycle, quad-texturing capability as it can apply four textures in one clock cycle. NVIDIA and ATI's GPUs are using two texture mapping units (TMUs) per pipe with exception to the original Radeon which uses three. The Parhelia's pixel shaders are still impressive nevertheless as it incorporates five shader stages per TMU, whereas competing GPUs use two. This once again allows the Parhelia to carry out much longer instruction sets than on other chips. The extra TMUs will greatly assist games in the future using massive multi-texturing.

Beyond 32-bit colour

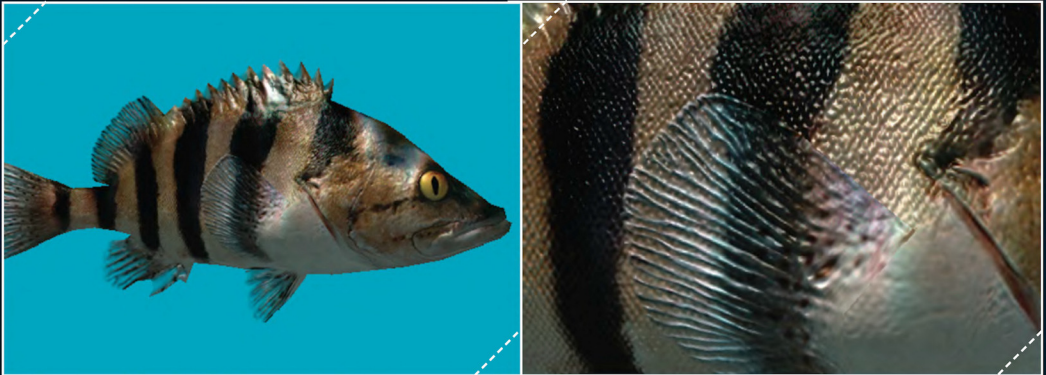
The Parhelia graphics pipeline is able to display 10-bit per colour component, giving it a total of 30-bit accuracy for Red, Green and Blue (RGB) but 2-bit for alpha. Every other graphics adaptor today uses 8-bits per channel to produce what is known as 24-bit True Colour. Matrox, being obsessed with image quality, obviously thinks it's time to move beyond the 16.7 million colours available in 24-bit palette. Having only 2-bits more per component allows the Parhelia to display 230 or over one billion discrete shades. Now you are probably wondering if there would be a tangible difference in quality. To be honest, until Longhorn (Windows XP's successor) arrives, you probably won't see an every day difference. If you are an avid photographer or graphics guru, you might see some improvement by maintaining 30-bits of colour throughout the pipeline. Matrox will be providing plug-ins for Photoshop to take advantage of this. For gamers, this will give you one more bragging right to poke at your friends. In theory, 30-bits help in multi-texturing as rounding errors will be reduced. This should be useful especially in dark areas and the benefit is transparent to all applications, meaning all your games will benefit.



ABOVE: When a company has such a high regard for the image quality from its cards like Matrox does, it needs the hardware to back it up. The Dualhead-High Fidelity (HF) architecture sports two independent RAMDACs in order to achieve this high quality. For surround gaming, a specialised RAMDAC is used in order to create a monitor spanning image up to a resolution of 3,840 x 1,024 in 32-bit colour.



ABOVE: Every video chipset release is accompanied by a showpiece demo. Matrox has taken things underwater to show off the fancy features of Parhelia.



What's really impressive though, is that Parhelia maintains 30-bits RGB throughout the entire pipeline, all the way to DVD output and the TV encoder. Matrox promises theatre quality DVD by using its GigaColor technology, equalling the 10-bit standard already found in DVD boxes.

Missing something?

The Parhelia does not have any bandwidth optimisations in terms of early hidden surface removal (HSR). The justification behind this is rather clear: Matrox has tackled the bandwidth issue by doubling its bus width rather than trying to remove some unnecessary work. Another problem is its die space, as already having 80 million transistors is really pushing the limits of the 0.15-micron process. If Matrox included advanced HSR, then the die size would become too large, exponentially adding to costs. In other areas, the Parhelia has significant efficiency enhancements. Its fast Z-clear unit will save a good

deal of fillrate. Although not indicated directly, Matrox has implemented a very sophisticated memory controller to manage its 256-bit interface. There are multiple (undisclosed) independent controllers that access the memory interface and various caches in place to hide page breaks and maximize burst efficiency. The controller array receives requests from these independent controllers then arbitrates the bandwidth as required. In principle, this is similar to the crossbar memory controller on the Geforce3/4. If Parhelia's memory interface is all that and more, we can expect it to reach near its 20GB/s peak capacity.

Glyph anti-aliasing

Just when you thought Matrox has maxed out 2D quality improvements, it comes up with Glyph anti-aliasing. It's not just by human nature that we prefer hard copies of things — it actually has a lot to do with the display. When buying printers, we always use

dot per inch as a measurement of quality, but when buying monitors, we use resolution in terms of horizontal multiplied by vertical. Strange is it not? While printers these days produce over 1440 dots per inch, most monitors are still stuck at 96dpi. Together with screen flicker and sub-par convergence, this makes people prefer paper over monitors. Parhelia's Glyph AA samples the text at high resolutions then scales it back, allowing up to 16 shades to display the text outline. Windows XP already features a similar font smoothing technique called 'clear type'. Although designed mainly for LCDs, many users have reported improvements with CRT monitors as well. Parhelia essentially accelerates this in hardware, freeing the CPU which may otherwise take a performance penalty of up to 30%. To complete the package, Parhelia allows for programmable gamma correction for Glyph AA, this of course is all done inside the 30-bit colour 2D engine.





ABOVE: Parhelia maintains 30-bit RGB colour throughout the pipeline, increasing colour precision and beneficial to both 3D and 2D graphics.

‘Parhelia is not for the masses. It is unlikely that we will see a drastically cut down version akin to the MX or LE, as this would not be consistent with what Parhelia stands for.’

Still the king of quality

When it comes to 2D and output quality, Matrox engineers are nothing short of freaks. These guys pull out oscilloscopes in their spare time and measure PLL jitter, frequency and response on their cards versus the competition. You can't help but admire them for their dedication into output accuracy, as they pursue the science behind the signal, not the cost. While NVIDIA is quick to blame IHVs (Immediate Hardware Vendors, board producers for NVIDIA chips) for poor 2D quality, Matrox does quite the opposite. It uses its vertically integrated business model to assure quality from design to finish. All of this is expensive, as we've recently seen ATI decentralise its business model into the likes of NVIDIA. Although this has brought down prices and raised availability, 3D enthusiasts are already seeing the negative aspects as cut-price board makers are now employing lower quality components, resulting in 2D display that is lower than that expected from classic ATI products. Luckily, Matrox is a private company with no public shareholders to answer to, and it doesn't need to be orientated around quarterly earnings, but rather to its other obsessions, such as quality.

The outlook for Parhelia

Matrox expects Parhelia to be available by July with two boards targeted at the consumer market. It projects a 128MB version for under US\$400 and separate boards will be released to target CAD and high-end workstations.

Parhelia will provide Linux drivers out of the box, a good sign for better drivers to come. Will Parhelia be a success? That really depends on our definition, as Matrox has explicitly stated that Parhelia is not for the masses. It is unlikely we will see a drastically cut down version akin to the MX or LE, as this would not be consistent with what Parhelia stands for. There are still a few factors which will be crucial to Parhelia's reception by the public, among them drivers, availability and developer support. Matrox has traditionally produced solid and stable drivers although not always across all platforms. By the indications I've been receiving, Parhelia will not be rushed if driver issues occur. In terms of availability, everyone is still in the dark. It's almost certain Parhelia-512 is the largest GPU to be made on the 0.15-micron process. It also happens to use the expensive 256-bit memory interface. When both

are factored in, it is uncertain whether Matrox's Taiwan-based fabrication partner, United Microelectronics Corporation (UMC) will be able to produce viable yields in time. On the developer relations front, Matrox is no slouch. The company is very proactive with game producers, and gains support even though its share in the gaming market is tiny. In fact, at E3, Epic chose Parhelia to demonstrate the upcoming Unreal Tournament 2002.

The future

If all goes well for Matrox and UMC, we will have a true third competitor in the high-end graphics arena. Before Christmas, we should see the P10 Visual Graphics Processor from 3DLabs/Creative and by August, we shall have announcements from NVIDIA and ATI on their NV30 and R300 parts, both of which are expected to be DirectX9 compliant. Will Matrox be able to stand the heat? Probably not with its long product cycles but I'll leave you this quote from the MURC forms to consider: 'You can produce the fastest 3D card and it will be superseded in six months, but if you produce the best all rounder card, in six months you will be beaten, but in other areas you shall not.'



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Atomic Benchmarks

The way we do the things we do.

Here at *Atomic* it is our primary intention to give you the final word on the latest in hardware and PC technology. An integral part of determining the performance of a particular piece of hardware is benchmarking, and this is something that we take very seriously in the *Atomic* Labs.

SYSmark2002

SYSmark is a product of the collaboration between industry group BAPCo (www.bapco.com) and MadOnion.com (www.madonion.com). It is one of the next-generation application benchmarks and is designed to more accurately replicate the day-to-day workload that a system is subjected to. The benchmark focuses on Internet Content Creation and Office Productivity tasks in order to generate a final rating.

SiSoftware Sandra 2002 Professional

Sandra, from SiSoftware (www.sisoftware.co.uk), is a comprehensive benchmark and diagnostics utility. It contains dozens of special module applets that retrieve detailed information about the specifications and settings of a system, by polling each component's built-in firmware or BIOS. Sandra also features

a small suite of synthetic benchmarks for specific components such as CPU, memory, CD-ROM and hard disk. It also features a burn-in wizard for stress-testing overclocked systems.

3DMark2000 Pro

3DMark2000 Pro from MadOnion.com is a powerful benchmark for testing Direct3D performance, and is the successor to the popular 3DMark99 MAX. Although it is a synthetic benchmark, it uses the advanced MAX-FX 3D engine from Max Payne, which is representative of the latest in Direct3D performance and technology.

3DMark2001SE Pro

3DMark2001SE Pro from MadOnion.com is the next progression of the popular benchmark utility. It also uses the MAX-FX engine and heavily emphasises DirectX 8.0 functions, including programmable shaders. The results are not comparable with results from 3DMark2000 Pro.

HSF testing

To test HSFs, we use our Athlon XP test bed, which uses an internal temperature diode. SiSoft Sandra 2002 is run in looping burn in mode, with both CPU tests selected for 30 minutes before the load temperature is

recorded. The CPU is then left to idle for 30 minutes before the idle temperature is taken.

Quake 3: Arena AtomicMPC Demo

Quake 3: Arena (Q3A), from id Software, is the very popular first person shooter representing the latest in OpenGL gaming technology. Q3A has a built-in benchmarking utility and built-in demos that can test graphics card performance. These demos are fairly simplistic, and are not representative of the worst conditions that the game can offer to a graphics card. So we developed our own AtomicMPC Demo that pushes the hardware as far as possible.

Other benchmarks

Sometimes we need to break down the tests into more specific areas, such as hard disk performance, or a particular facet of 3D like T&L or SSE. For these specific purposes we can draw on a vast number of applications, games and dedicated benchmarks such as CD Speed 99, DisplayMate, Dronez, MDK2, Adaptec ThreadMark, or Serious Sam. We also use a Lian Li temperature probe from Anyware (www.anyware.com.au) for tests that involve the measurement of temperatures, such as HD heatsinks. ○

Atomic testbench specs

Both systems are running Windows XP Professional with DirectX 8.0a, as well as the latest official NVIDIA drivers.

- AMD Athlon XP 1800+ system – ASUS A7V266-E motherboard (supplied by Cassa: www.cassa.com.au)
- Intel Pentium 4 2GHz – ABIT TH7 RAID motherboard (supplied by ABIT: www.abit.com.au)

Common components

- Samsung 256MB PC2700 DDR-RAM (supplied by Cassa)
- Samsung 256MB PC800 RD-RAM (supplied by Cassa)
- Hercules Prophet II GTS 32MB (supplied by Guillemot: <http://au.hercules.com>)
- 20GB Ultra DMA/100 7,200rpm hard disk drive
- Hercules Prophet II GTS 32MB (Supplied by Guillemot: www.hercules.com)
- Sound Blaster Live! Player (Supplied by Creative Labs Australia: www.creaf.com)
- ASUS 52X CD-ROM (supplied by Cassa)
- Belkin PCI FireWire card (supplied by Belkin: www.belkin.com.au)
- Belkin PCI USB 2.0 card (supplied by Belkin)

Benchmark settings

3DMark2001SE Pro

- 1,024 x 768, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer
- 1,024 x 768, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer
- 1,600 x 1,200, 16-bit colour, 16-bit textures, 16-bit Z-buffer, triple frame buffer
- 1,600 x 1,200, 32-bit colour, 32-bit textures, 24-bit Z-buffer, triple frame buffer

Quake 3: Arena AtomicMPC Demo

All tests use Quake 3 1.27g and our custom Q3A demo recorded by the Atomic staff

- CPU testing: 320 x 240, maximum geometry detail, minimum graphics settings, high sound quality
- Graphics cards: Low quality = 1,024 x 768, normal quality graphics settings, sound disabled
- Medium = 1,280 x 1,024, maximum graphics settings, with all game sound disabled
- High = 1,600 x 1,200, maximum graphics settings, sound disabled

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02



REVIEWS

id and ergo

Forget gaming – John Gillyooly is convinced that Doom III at E3 has much deeper implications for the 3D hardware industry.



It was fun watching the online coverage of Doom III con, I mean E3, 2002. As hordes of Webmonkeys raced to add to the growing pile of different spins on the same Doom III subject matter, speculation was rife as to just what video hardware was powering the demonstration. John Carmack's now infamous February .plan update contains the oft quoted line 'Do not buy a GeForce4-MX for Doom', which definitely put that chipset out of the running, but apart from that, the title of 'card that first showed people what Doom III could do' was up for grabs.

Before the show the word on the 3D street was that id would be using a non-NVIDIA-based card for the demo, which of course sparked off the rival packs of notoriously rabid 3D fanboys as they circled each other trying to claim ownership of the card for their chip maker of choice. The seedy back alleys and forums of the online 3D scene were filled with the shouts of ATI evangelists, Matrox revivalists, PowerVR congregation members, 3DLabs cultists and one or two or two 3dfxites who had been so engrossed in their games of Quakeworld TF they missed a few important events over the past few years.

As the minutes of E3 ticked by, the Web started filling up with all sorts of disjointed rants claiming 'inside info' about what was driving Doom III. As more time passed, the statements started pointing towards one company: ATI. Speculation then started bouncing around as to whether this meant a RADEON 8500 (Carmack's February .plan update talked about the RADEON 8500's pipeline being perfect for the texturing used in Doom III) or the next generation RV250 or R300 cards. It was pretty easy to discount the RV250, as it is designed to be ATI's next budget chipset.

As the show finished, the speculation was killed by a press release straight out of ATI headquarters in Ontario, stating that Doom III was being displayed on ATI's next generation graphics hardware. While it wasn't explicitly named, this means R300, which in turn means much more than the fact that ATI has working R300 silicon, it means that the silicon is so advanced that both ATI and id were comfortable to have it running in a critical role for three days solid (there was a minor unspecified glitch that meant id had to turn off Anisotropic filtering, but it was tiny).

Which begs the question of why we haven't seen any product announcement yet from ATI. From everything we have heard, the R300 is not only a GeForce4 Ti killer, it has the potential to smack NVIDIA's next-gen offering, NV30, around the park. In an industry that works on such a rapid timeframe, getting the jump on the competition by a few months has the potential to seriously skew the competitive balance.


This is becoming even more of an issue. With the Parhelia-512, Matrox is now back in the spotlight with a fairly awe inspiring featureset, plus 3DLabs is looking at the consumer market again with the P10, and now has the large commercial clout of Creative Labs to make this a reality.

Even with all this increasing pressure, ATI is still saying the R300 won't be hitting the market until 'Fall', which of course means Spring for us neglected Antipodeans. The big reason behind this most likely lies with Microsoft, and its long awaited DirectX 9. DirectX 8 has been around for a while now, having first been unleashed on the public back in November 2000, and DirectX 9 marks a significant departure from Microsoft's previous API development schedule.

DirectX 6 was released in 1998, DirectX 7 in 1999 and DirectX 8 in 2000. The shift to a two-year path for development is indicative of the growing importance of DirectX as the primary API for 3D game development. OpenGL has suffered for several reasons, mainly due to the almost ridiculous amount of custom commands that are needed for manufacturer-specific development. This is being rectified with the 3D labs-spearheaded OpenGL 2.0 project, but for the short term everyone but John Carmack seems to be developing with DirectX.

DirectX 9 has recently hit its first beta stage, instantly leaking out onto the Web and being downloaded by the hordes despite an inbuilt Windows-crippling expiry date of 20 August 2002, by which stage the second beta will be available to beta testers. It seems on track for a similar 'Fall' release to the R300.

It appears that unlike the previous generation, in which hardware lagged behind the release of the DirectX 8 by significant amounts, the chipset manufacturers are well ahead of the API with hardware development. While Parhelia and P10 are 'partially DirectX 9 compliant', the smart money is on the fact that NV30 and R300 are both fully DirectX 9 compliant and we can expect to see the final products announced almost simultaneously with the release of DirectX 9.

The rumbles have begun, and the NVopolly that marks the graphics hardware market is looking nowhere near as solid as it did a year ago. id Software's choice of R300 to demonstrate Doom III does not necessarily mean that R300 is an NVIDIA killer, but it does telegraph the fact that there are now credible alternatives on the way. And this can only be a good thing for us. 

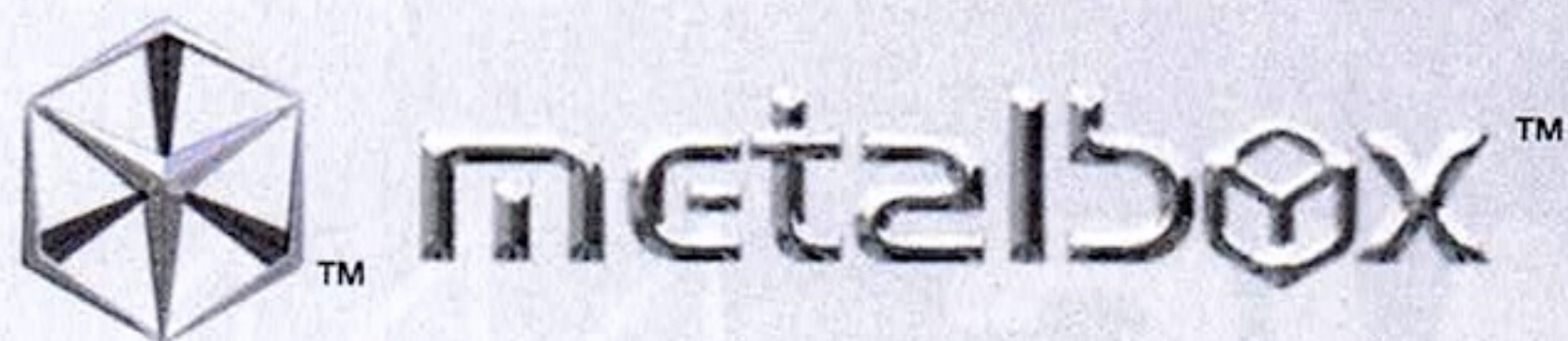


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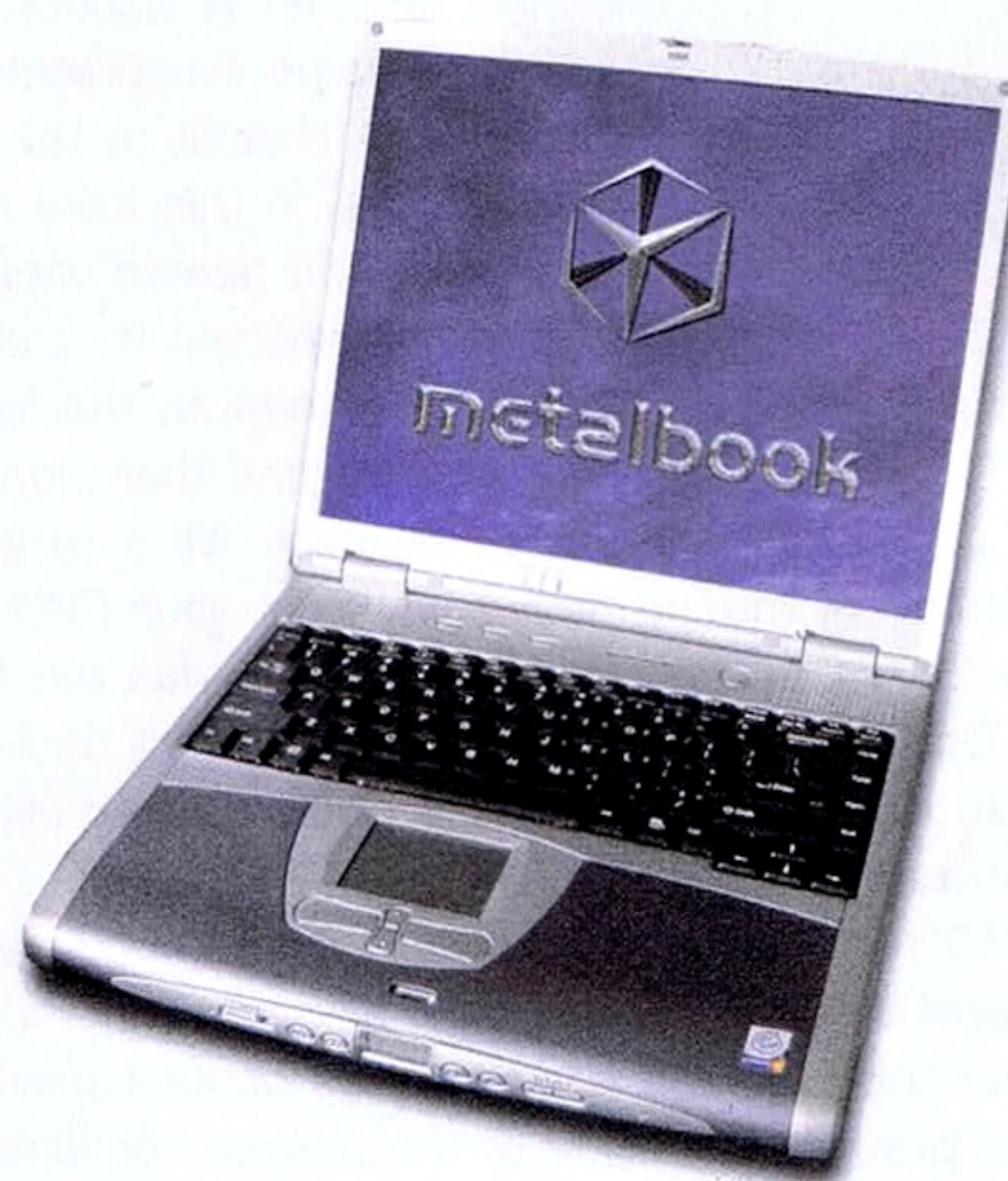
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Coolermaster IHC-L71 Silent Heat Pipe



For those who can't remember, a heatpipe works by transferring heat from one point to another. A solution within the heatpipe evaporates at the point closest to the heat source, in this case near the CPU. The heated vapours are then transported to a cooler point, in this case next to the fan, where they condense and then flow back to the lower hot point. It's a simple and effective method of moving heat away from your CPU, yet the only other HSF we've seen using a heatpipe was the AMD compatible CoolerMaster HHC-001. An excellent cooler it turned out to be, so it's no surprise to see CoolerMaster using this technique in its latest P4 HSF, the IHC-L71.

The IHC-L71 is constructed entirely from copper. While we've become sceptical about the ability of all copper HSFs, we are willing to give this HSF the benefit of the doubt considering the merits of its predecessor. Due to the copper construction, this HSF weighs in at a motherboard bending 700 grams, with fan attached. We were slightly shocked to see that the maximum speed of the included 60mm fan is a meagre 2,500RPM, which pushes a measly 20.5CFM. The side effect of this is that this HSF is even quieter than the almost silent stock Intel P4 HSF.

The IHC-L71 uses a slightly different variation of the usual locking mechanism on P4 coolers, and we've got to admit that it wasn't as friendly as the usual, being a tough bastard to lock down. Considering the weakness of the fan, we didn't expect this heatsink to break any temperature records. We would have loved to test this heatsink with a more powerful fan, but it appears that 70mm fans are rarer than the proverbial. Testing took place on a P4 2.2GHz at a constant ambient room temperature of 20C. For comparison's sake we also retested with the standard Intel HSF that ships with the 2.2GHz CPU.

Load temperature for the IHC-L71 reached 45°C, while the Intel cooler peaked a degree hotter at 46°C — not a huge margin by any stretch of the imagination. Idle temperature for the IHC-L71 was identical to that of the Intel cooler, at 36°C.

It's not really worth forking out extra dollars to drop your CPU load temperature by such a small margin, unless you can track down a decent 70mm fan. If you do hate the sound of the near silent Intel HSF, you take the meaning of the word anal to new levels, and could probably do with some therapy. □

SPECIFICATIONS

2,500RPM 60mm fan @ 20.5CFM; all copper construction; heat pipe.

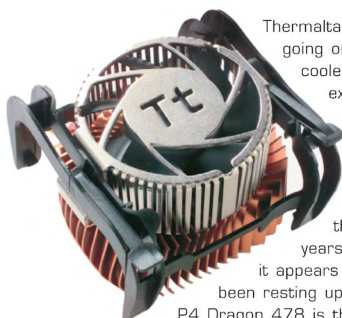
Website: CoolerMaster www.coolermaster.com

Supplier: Australia IT www.australiait.com.au

Phone: Australia IT (03) 9882 1811 **Price:** TBA

7/10

Thermaltake P4 Dragon 478



Thermaltake had a good thing going on with its Orb line of coolers. Combining excellent performance with distinctive looks, the Attack of the Orbs took the CPU cooling world by storm. However, this was a couple of years ago, and ever since it appears Thermaltake has been resting upon its laurels. The P4 Dragon 478 is the latest example of just how far behind the eight ball Thermaltake

has slipped.

The Dragon is comprised of three main parts: the heatsink, a clip on fan, and the mounting bracket. Let's take a look at how shoddy each of these parts are. First up is the heatsink, which appears to be all copper, until you scratch one of the fins and see that it's actually Aluminium anodised to look like copper. Can you spell dodgy?

There is a copper slug in the centre, but the rest is all Aluminium. Then there's the incredibly loud fan, which, if you enjoy shattered eardrums, you're gonna dig. And finally we have the craptastic mounting bracket, which snapped around the locking arm mechanism the very first time we mounted

this heatsink. After replacing the mounting bracket with one from the default Intel heatsink, we tested this HSF on a P4 2.2GHz. Considering how incredibly loud this HSF is, and the fact that it has a copper slug in the centre, we expected it to perform much better than the Intel HSF. However, 'woeful' is a good word to describe the performance of this HSF.

Where the Intel el cheapo, near-silent HSF reached a load temperature of 46°C, the Dragon decided to go one better and up the load temperature to 50°C. Idle temperature was just as disappointing: the Dragon reached 38°C while the Intel HSF peaked at a lower 36°C.

Considering just how bloody loud this HSF is, we tested again to make sure these results were accurate. Which, unfortunately for Thermaltake, they were.

So not only is this HSF loud and fragile, it's also a shocking performer. Sure, it looks better than the stock standard Intel HSF, but this doesn't balance out its deficiencies in every other area. Even if Thermaltake offered to give free weekly back rubs to everyone who purchased this HSF, it still wouldn't be worth it. □

SPECIFICATIONS

6,000RPM fan @ 49.4CFM; copper core with Aluminium fans; and three pin fan header.

Website: Thermaltake www.thermaltake.com

Supplier: Anyware www.anyware.com.au

Phone: Anyware (03) 9763-8400 **Price:** \$70

2/10



FlexScan L685



OK. . . now we are impressed. The FlexScan L685 has destroyed our preconceptions that LCD displays suck by sporting an impressive 400:1 contrast ratio and comfortably displaying up to 1,280 x 1,024 pixels in 16.7 million colours (we counted them all) on the full 18.1" of TFT viewing area. At its refresh rate of 60Hz, the image was sharp, bright and clear. Adjusting the refresh rate higher to its maximum of 75Hz saw the image lose some focus and clarity, however this is to be expected and was quickly rectified by messing with the phase control in the OSD.

The two DVI ports in the L685 can automatically detect and manage signals from both digital and analog sources; and you can connect two PCs to the one monitor, with a function to set priority of one PC over the other, or manually select between the two.

The monitor uses image scaling to stretch a resolution of less than the native 1,280 x 1,024 to the full viewing area of the screen. It then cleans up the jagged or blurry text that is often caused by the stretching using image smoothing from the OSD. The FlexScan range of Eizo monitors uses the fangled D³ ASIC (Application Specific Integrated Circuit) technology. The D³ stands for Digital Signal Processing, Digital Image Control, and Digital FlexScan, providing a great deal of control over various

image adjustments such as brightness contrast, screen position and so on.

This LCD sure does look nice on our desks too. The surrounding bezel is only about 17mm wide and the OSD buttons are flush and unobtrusive, and at only 7cm deep, it can be removed from the stand for wall mounting. It also works nicely in both portrait and landscape orientations.

There is a great deal of flexibility in the position of the monitor on its stand. It can be raised or lowered up to 8cm, tilted back up to 40 degrees or pivoted horizontally up to 170 degrees. This extreme viewing angle would normally cause the image to fade from view on some LCD displays, but not this little ripper. Unless we were looking at the back of the screen, the image stayed crystal clear.

The FlexScan range is available in both grey and black (the black looks much better – trust us). Although these types of displays are never cheap, the FlexScan L685 isn't overpriced for its size and quality. This is one 'inimitable facile princeps' LCD display that won't disappoint. □

SPECIFICATIONS

46 cm (18.1 inch) TFT Colour LCD; 0.2805 mm x 0.2805 mm pixel pitch; H: 27- 82 kHz, V: 50 - 85 Hz.

Website: www.eizo.com.au

Supplier: ARCADIA www.eizo.com.au

Phone: ARCADIA 1800 705060 Price: \$3,465

9/10

HYDRAULIC — SF860B ATX Case



'It so black, how much more black can you get? The answer is none. None more black.' – Spinal Tap.

Black cases have that certain desirable look: an elegance that no other colour seems to achieve. Looking past the colour, the most obvious feature of this ATX mid-tower is the sliding front cover, which is released by a small button at the top, and slides slowly down the front.

The use of the name 'Hydraulic' is a little misleading, as it really implies the mechanism is fluid driven – it isn't. It looks nice and the effect is reasonably convincing, but the mechanics are fairly basic and have more to do with boring old gravity than any true fantabulous hydraulic machinery.

The internal design deserves deeper appreciation. For example, the front panel is screwless and removable, as is the 3.5-inch floppy drive frame, but what is really cute is that motherboard tray and back panel are riveted together and can slide out together from the rear of the case. This makes system building a much less fiddly

experience. You can get all your expansion cards mounted and secured without putting your hands inside the tower, then slide it all back in one piece.

The case is made from pressed steel, but all the edges are rolled, so when you're messing around inside you won't experience any accidental cutting of finger tips or other body parts.

Apart from the fancy shmancy sliding cover thingy, the overall appearance of this case is sleek and minimalist: no decorative trims, or glow in the dark buttons, no hidden panels with USB or sound connectors. Just a simple on/off button and reset button. It's all well made, being both solid and rugged in design.

Considering just how friendly this case is for system builders, as well as its rugged good looks, the low asking price of \$130, which includes a 350W PSU, this is an amazingly priced case. Which is one of the reasons we rate it so highly.

A full tower version will be available in the near future and is expected to sell at around \$150.00. □

SPECIFICATIONS

Dimensions: 445 x 190 x 190; motherboard: AT/ATX/P4 ATX/Micro ATX; expansion slots: 7; PSU: Atlas FP-350WE.

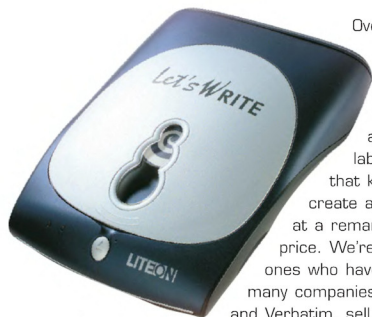
Website: AusPC Market www.auspcmarket.com.au

Supplier: AusPC Market www.auspcmarket.com.au

Phone: AusPC Market (02) 9817 2899 Price: \$132

9/10

LITEON LXR-24101A



Over the last couple of months, LITEON has established a reputation around the Atomic labs as a company that knows how to create a zippy CD burner at a remarkably reasonable price. We're not the only ones who have realised this as many companies, including Sony and Verbatim, sell rebadged LITEON

drives, usually at a higher cost than the equivalent LITEON. The LXR-24101A is the first external USB2.0 CD-RW ever to grace the Atomic labs, so deciding to review this drive was an absolute no-brainer.

The first thing you'll notice is that this drive looks very similar to the Iomega Predator, complete with spiny spiral bit to hypnotise you while you're backing up your important data. If you're after FireWire support, you're going to be out of luck with this drive unless you buy a FireWire adaptor, but the USB2 connection ensures that this is one of the speedier external burners available. Just how speedy can a USB2.0 drive be?

Using our beloved NeroCDSpeed99 and CD DAE

benchmarks, we tested the read, write and DAE speeds of this drive. Read speed came in at a very respectable average of 30X, which is of course lower than the advertised read speed of 40X. We're still hoping that one day CD-RW manufacturers will learn the meaning of the word 'honesty' and start advertising the average speed of their drives over an entire disk, instead of just the peak speed, which is reached only on the outer portions of disks.

Write speeds were much closer to their advertised speed, reaching a very capable average of 23X, which is close to the claimed 24X speed. Finally, the DAE speed reached an average 28X, which isn't quite up there with the optimistic advertised speed of 40X.

Combine these respectable speeds with support for RAW-DAO 96 mode burning and a reasonable price, and we end up with one desirable external CD-RW. While many people won't yet have a USB2.0 port, the glut of motherboards being released with these ports at the moment will soon remedy this minor quibble. □

SPECIFICATIONS

24X10X40X speed burner; USB2.0 backwards compatible with USB1.1; Smart-Burn buffer underrun protection.

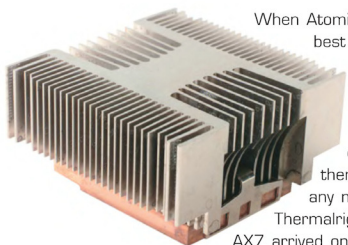
Website: www.liteon.com

Supplier: C W Supplies www.cws.net.au

Phone: C W Supplies (03) 5945 2000 Price: \$342

9/10

Thermalright AX7



When Atomic rounded up the best heatsinks for the Athlon eight months ago, the Thermalright SK-6 emerged as the clear winner. Since then we haven't seen any more products from Thermalright, until the day the AX7 arrived on our doorstep

pleading to be attached to the steamiest CPU we could find – which just happened to be an Athlon XP 2100+. It's larger than your average heatsink, designed so that an 80mm fan can be attached directly onto it without the need for a shonky 80mm to 60mm fan adaptor. Noise output is lessened by using an 80mm fan, while airflow through the heatsink remains high. The large size of the AX7 means that you'll need to check that it won't take out any capacitors in the process of being installed. Shunning the all copper construction that many heatsink manufacturers believe guarantees instant success, the AX7 is a hybrid of both copper and Aluminium. The base plate is crafted from copper with a smooth and even finish while the fins are made from Aluminium. This helps to keep the weight of this monster at a bearable 430 grams.

When it came time to test we used the sweltering Athlon XP 2100+, as stated above, which runs at a speed of 1.73GHz.

For the purpose of comparison, we also tested it against ye olde faithful GlobalWin FOP-38. Ambient temperature was a constant 20°C throughout the entire test.

Considering Thermalright makes this HSF, its brilliant benchmark results weren't too surprising: while the noisy FOP-38 reached a load temperature of 49°C, the much quieter AX7 stayed at a cool 43°C. It must be noted that this was with an 80mm 5,000RPM Delta fan in place; with a slower yet silent Pabst 1,500RPM fan it reached a dangerous 64°C. So using the right fan with this heatsink is a must. Idle temps were also impressive, coasting along at 39°C, compared to 42°C for the FOP-38. These temperatures make the AX7 one of the best performing heatsinks Atomic has had the pleasure of putting through its paces, at half the volume you'd expect from such a high performer.

Good things come to those with wads of cash, and the AX7 is no exception. At \$84 with no fan, this heatsink definitely falls into the higher end of the price spectrum. But you can't put a price on a happy CPU, and we're sure your CPU is going to be a very happy chappy with an AX7 keeping things cool. □

SPECIFICATIONS

Copper heat spread; Aluminium fins; weight: 430grams without fan.

Website: www.thermalright.com

Supplier: Below-0 www.below-0.net

Phone: Below-0 (07) 3348 2155 Price: \$84 without fan

9/10

Papst fans



When it comes to cooling, Papst fans have a reputation for being the Mercedes Benzes of the cooling world. Fifty years of German engineering have resulted in a series of fans that are second to none in terms of quality.

We checked out the 60mm, 80mm, 92mm and 119mm fan sizes. It must be noted that when compared to

some of their louder relatives, such as the fans from Delta and Sunon, the Papst fans move a much lower volume of air. For example, the 60mm unit, which only spins at 3,000RPM, moves a meagre 14.7CFM. When you compare this with most other 60mm fans, which churn out between 30CFM and 50CFM, we can see that these fans haven't relied upon air throughput to build their great reputation.

What makes these fans stand out is the volume they operate at: the 60mm unit we checked out operated at a level of 19dB(A), making it easily the quietest 60mm fan we've tested.

Due to their low throughput, these fans are definitely not suitable for use on a CPU, unless you happen to be running

a very cool CPU such as the Via C3. During the testing of the Thermalright AX7 HSF (see page 52), we used the 80mm Papst fan and found the temperature soaring past the 60°C mark; by comparison, with a Delta fan in place, the temperature plummeted to a much more reasonable 43°C, albeit at a much louder volume.

So you've been warned: don't bother trying to use one of these near silent fans on a CPU, unless you prefer your CPU to emit smoke rather than crunch numbers.

While these are the quietest fans we've heard, they also happen to be some of the most expensive. So is it worth spending so much on each of these fans, knowing that they aren't best of class when it comes to performance?

It really depends on how much you value a quiet PC, and whether or not your PC is bristling with more fans than a Britney Spears concert. If so, and your current case fans are keeping the neighbours across the street awake into the wee hours of the morning, not to mention your housemates, then you need look no further.

SPECIFICATIONS

Sinter Sleeve Bearing, various sizes.

Website: www.papst.de

Supplier: Low Noise PC www.lownoisepc.com

Phone: Low Noise PC (02) 9403 3305

Price: 60mm \$29.50, 80mm \$28, 92mm \$33, 119mm \$36

7/10

mStation the in-car audio jukebox

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- Cables and mounting brackets
- mStation carry case
- Instructional manual

Home Kit includes:

- mStation
- USB drive disk
- Power Cables
- Blank plate
- Audio connection cable
- USB connection cable
- Instructional manual



Specifications Dimension (w x d x h) 122 x 230 x 43 mm • Weight 1100g (without HDD) • Memory media 3.5 inch IDE hard drive (not included) • frame build in NEO35 PC • cooling 40 x 40 x 10mm turbo fan • SNR 100 db • D/A converter 18 bit • THD better than 0.01% • frequency response 20Hz-20kHz • operation system WIN98/2000, MAC OS.

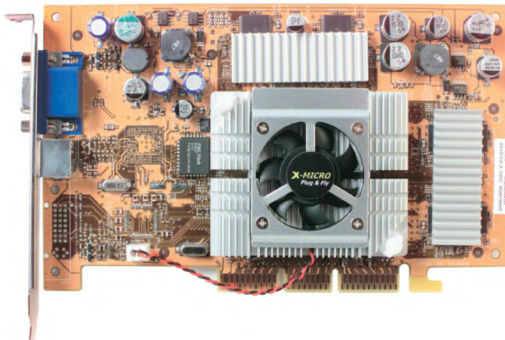
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www.kazelectronics.com.au or Phone: 02 6259 8699

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Home
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X-Micro Impact T4200 64MB

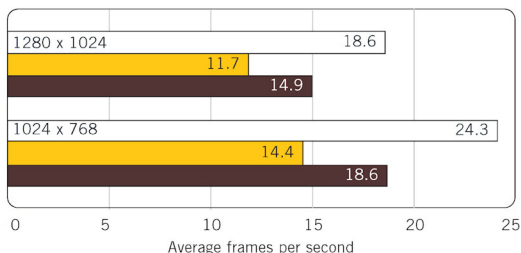
Forget the MX – the GeForce4 Ti4200 is everything John Goolooly ever wanted.



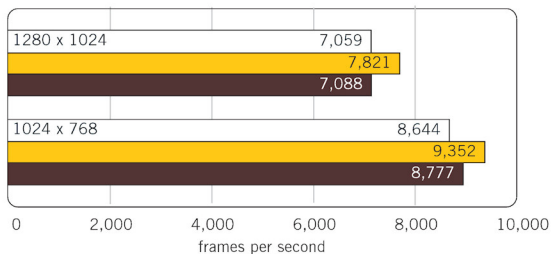
It was a somewhat amusing sight to see NVIDIA unleash a torrent of new video chips on the unsuspecting public, only to realise that one of the models would kill the chances of being able to move the last stock of its previous line. The culprit was the GeForce4 Ti4200, the lowest speed variant of NVIDIA's highest speed product line, and it was feared that low pricing and high performance would stop consumers from buying up the last of the GeForce3 Ti500 cards to trickle out of the foundry. Now that the supply of GeForce3 Ti500 chips has finally dried up, the GeForce4 Ti 4200 has made a belated entry into the market. Available in both 64MB and 128MB variants, the cards are based on a different, lower cost reference design than the Ti4400 and Ti4600. For the 64MB variant such as this X-Micro Impact T4200, the core is clocked at 250MHz and the RAM at 500MHz. Just to confuse things, as is NVIDIA's want, the 128MB pairs the 250MHz core with RAM running at 444MHz. As is usually the case with the lowest end of a chipset range, the GeForce4 Ti4200 is an impressive overclocker and we managed to crank the X-Micro Impact T4200's core speed to 310MHz, 10MHz faster than a GeForce4 Ti4600, and squeezed 100MHz out of the RAM to get it to 600MHz before display artefacts began – an impressive overclock indeed. We used Serious Sam SE, 3DMark2001 SE and Codecreatures Pro to test the X-Micro Impact T4200. The card was tested at both stock speed and at the 310MHz core / 600MHz RAM overclocked speed, and then compared with a Prolink 128MB GeForce4 Ti4200.

The X-Micro Impact T4200 kicks serious arse, benching faster than the previous generation's speed champion, the GeForce3 Ti500. When overclocked, the X-Micro Impact T4200 leaps ahead, delivering performance that will beat a GeForce4 Ti 4400. Even though the core could be clocked higher than a Ti4600, the RAM cannot reach similar heights. The Codecreatures benchmark results show a strange quirk when the card is overclocked, in that performance actually decreases. This is a limitation of the 64MB of RAM that the card sports. Codecreatures is the only gaming benchmark available that requires 128MB of video RAM to run. For 64MB cards it uses 64MB of system RAM via the AGP port, and when overclocked the AGP bus creates a bottleneck that severely hampers performance. which is unsurprising seeing that memory management is a major issues on modern cards.

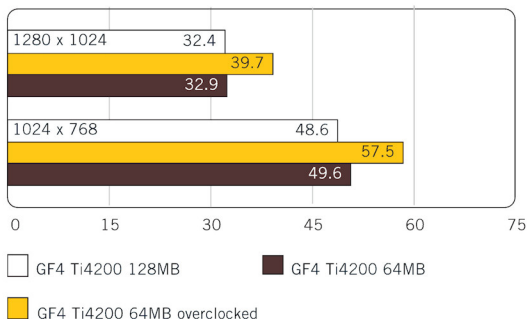
Codecreatures Benchmark Pro



3DMark2001 SE



Serious Sam: SE Coop demo



That said, for the short to medium term this will not be an issue. No games actually use that much video memory, and everything else about the card makes the issue pale into insignificance. The Ti4200 delivers amazing performance for the price, and with the incredible overclockability the X-Micro Impact T4200 is a very sexy little card indeed.

SPECIFICATIONS

NVIDIA GeForce4 Ti4200; 64MB DDR RAM; and S-Video TV Out.

Website: X-Micro www.x-micro.com

Supplier: AusPC Market www.auspcmarket.com.au

Phone: AusPC Market (02) 9817 2899 Price: \$423.50

9/10

Intel Pentium 4 1.8A GHz

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Intel Pentium 4 1.6A GHz

Bennett Ring, the performance whore, turns his back on AMD and shacks up with Intel.



Every once in a while a CPU is released that makes you realise just how worthwhile overclocking can be. It started with the Celeron 300A, which easily reached a speed of 450MHz; AMD then stole the crown of overclocking champion with the 1GHz Athlon AXIA, which seemed quite

happy to be pushed to 1.4GHz or better; and now we have Intel's Pentium 4 1.6AGHz, which has received wide spread acclaim online – but just how high can Intel's new wonderchip go?

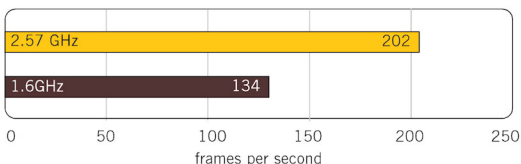
You'll notice there is an A after the 1.6 speed designation, denoting that this CPU is of the new Q.13 micron, 512K cache Northwood design. Knowing that the Northwood architecture is designed to take the P4 up to the 3.5GHz mark and beyond, it doesn't take a prophet to see that the 1.6AGHz Northwood is bound to have a bit of headroom for overclocking. But nobody in the *Atomic* office could have foreseen just how much headroom this budget P4 actually had.

Before we reveal how blindingly fast we got this chip to run, we have to thank Altech (www.altech.com.au) for supplying this CPU. After several weeks of scouring supplier's Websites we finally found one at Altech, and a phone call later the 1.6A was on its way. This low speed Northwood P4 was introduced as a stopgap measure to supplement Intel's 0.18 micron 1.6GHz and 1.8GHz CPUs to meet demand, hence their scarcity. So if you're looking for one of these CPUs after reading this review (and who wouldn't be?), you now know where to start your search.

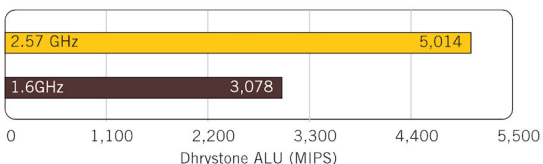
For testing purposes we used the ABIT IT7 motherboard with 333MHz DDR-SDRAM, also reviewed in this month's *Atomic*. We used this mobo as it allows you to lock the PCI speed at 33MHz and the AGP speed at 66MHz, regardless of what frequency the front side bus is run at. This is crucial when overclocking Intel chips, as front side bus overclocking is the only way to go with these multiplier locked chips, which can lead to unstable behaviour in your PCI and AGP devices. Due to the high speed the memory was being run at we had to set the CAS and other RAM timing settings to their most conservative values.

After locking the PCI and AGP ports to their respective speeds, it was time to crank up the front side bus speed. As this chip is designed with a 100MHz front side bus in mind, the new 133MHz FSB Socket 478 motherboards are the perfect hosts for overclocking. After setting the FSB to 133MHz, we managed to get the CPU running at 2.128GHz, without increasing the CPU core voltage. The IT7 allowed us to increase the CPU vcore to a maximum of 1.7V, and after doing so we were able to push the front

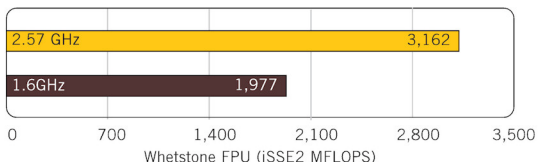
Q3A: Atomic demo, CPU settings



Sandra Arithmetic



Sandra Arithmetic



side bus all the way up to 161MHz, giving us a stable 2.57GHz CPU. We booted into Windows at 2.6GHz, but could not run benchmarks at this speed.

At 2.576GHz the CPU is running at a massive 976MHz faster than intended, making it 61% faster than the default speed. To test the overclocked CPU we ran the SiSoft Sandra CPU benchmarks and the Quake 3: Arena Atomic demo using CPU settings. The Sandra results showed a linear 61% increase in performance, while Quake 3: Arena showed an increase of around 51%. Impressive.

When you consider that this \$300 CPU runs at a speed greater than Intel's fastest CPU (the 2.53AGHz P4 which retails at around \$1,300), it becomes clear that this CPU is a bargain too good to be missed. While we can't guarantee that all P4 1.6AGHz CPUs will overclock so well, it's doubtful that you won't reach at least 2.2GHz. If you can't find a 1.6AGHz P4, you should find that the 1.7AGHz and 1.8AGHz P4s overclock just as well, if not better. The days of AMD CPUs being the ultimate chips for overclocking are well and truly over with the release of this CPU. Well, that is until we see what the Thoroughbred can do. . .

SPECIFICATIONS

0.13 micron Northwood P4; 512k cache; Socket 478; 1.5V default CPU Vcore voltage; 100MHz default FSB.

Website: www.intel.com

Supplier: Altech www.altech.com.au

Phone: Altech (02) 9748 2233 (07) 3846 5355 Price: \$308

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Intellimouse Explorer



This is version 3 of the Intellimouse Explorer from Microsoft. Using the fancy named 'Intellieye Optical Technology', it is supplied as a USB device, but a PS2 adaptor is also provided. The design has been altered and improved slightly from previous versions, with the two thumb buttons on the left being slightly raised and moved to a less clumsy position. The cool black and grey colour scheme has been kept and it still looks fully slick.

Gamers have avoided optical mouse devices to a large extent, as they complain of either 'stuttering' in performance or the mouse movements getting lost all together when moved around too quickly. That doesn't seem to apply here.

The previous optical Intellimouse from Microsoft had a scan rate of 1500 scans per second, however this one scans at around 6000 per second – having used both, the difference is clearly noticeable – and the movement and corresponding cursor movements are fluid and responsive. When we jumped into a few maps of Return to Castle Wolfenstein we found the mouse performed flawlessly and with pinpoint accuracy while spawn camping on the beach, as you do. . .

Microsoft sure knows how to make a comfortable mouse: the soft contoured, ergonomic design is probably one of the best-shaped and best looking of all the optical mouse devices around; and while we don't want to sound like we are sucking up to Microsoft here, the Intellimouse is also possibly one of the best pointing devices currently available. Yes. . . we are gushing, but to be truthful. . . there aren't many other objects we would prefer to be holding on to when sitting in front of our PCs.

Version 4 of the Intellipoint software is bundled, but it isn't mandatory, as the mouse will work under any version of Windows (the PS2 adaptor is required for Windows 95). However, the software does provide you with a great deal of control over the way your mouse performs as well as customising all five buttons. You can even use the software to set program specific button assignments. In true Microsoft form, a reboot is required after installation.

This is one for right handers only, although to be fair, very few manufacturers do produce left handed mouse devices and MS do sell an ambidextrous mouse of different design.

SPECIFICATIONS

5-buttons, scroll wheel; 6,000 scans per second optical, USB connector with PS2 adaptor.

Website: Microsoft www.microsoft.com

Supplier: Microsoft www.microsoft.com

Phone: Microsoft (02) 9870 6800 **Price:** \$99.95

9/10

Sunpower SPW-6250P1 PSU



This PSU from Sunpower is in a 1U form factor, which makes it good for two things: rack

mount servers, or case modding. Its dimensions are 250mm x 82mm x 40mm and its long flat shape means that with some custom brackets, it can be tucked away nicely in the farthest corner of your case. This may or may not improve airflow, but it could go a long way to improving the overall neat and tidy look you are trying to achieve.

This unit has five Molex connectors and only one floppy drive connector, but with floppy drives being slowly phased out of many systems, only one floppy connector is no big deal. In terms of its ability as a power supply, this unit performs admirably: our trusty *Atomic Multimeter*[TM] tells us that the +3.3VDC rail likes to hang out around the 3.32 volts mark, the +5V rail sits at 4.99 volts and the 12VDC rail is rock solid on 12.64 volts. All of this equates to a very acceptable performance.

Here comes the bad news: at only 250Watts, this unit will be a tad underpowered for many, especially those running Athlon/GeForce combos. So now that we know it won't do for an Athlon, what about Intel support? Unfortunately, this PSU is also lacking the four prong

ATX12V connector required for most P4 systems.

Considering these limitations, there aren't going to be many systems that this PSU is suitable for.

What really strikes us though, is the annoying whirring sound from such a tiny fan. As the height and width of this unit is considerably smaller than traditional form factor power supplies, its cooling fan is correspondingly smaller too. The itty-bitty fan isn't loud so much as whiny to the point of irritating – yells of 'Turn that thing off!' being followed with 'Or else. . . ' were heard in the labs.

There aren't many reasons to look at this PSU, because not all rack mount 1U form factor PSUs are this noisy, or underpowered. Sunpower is certainly not a big player in the home PC PSU industry, but it does make a good range of hot swappable, redundant and other type of PSUs, targeted mainly for the server and industrial end of the market. In another environment, this PSU might be ideal. Or not. But here's the clincher: it will cost you \$319! Considering that you can pick up a quality 520W PSU for a hundred dollars less, then there is little justification in buying this one.

SPECIFICATIONS

250W power supply unit; ATX 1U form factor; Universal AC input 90V – 264V; and five Molex 1 floppy connector.

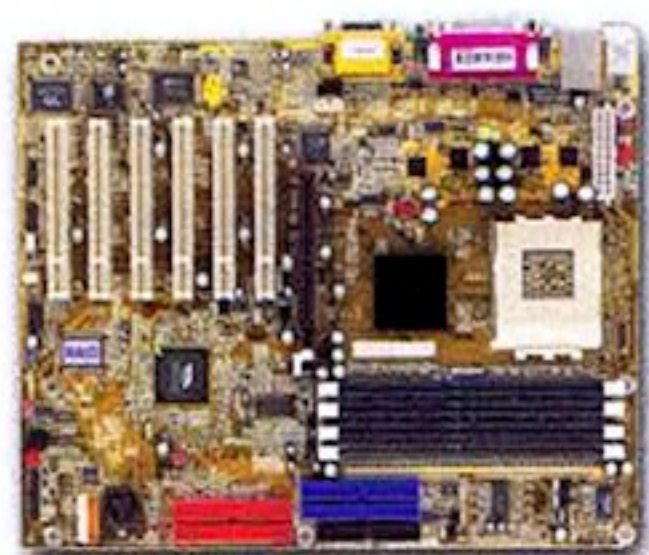
Website: www.sunpower-aei.com

Supplier: @Prolmage www.aprolmage.com.au

Phone: @Prolmage (03) 9558 8118 **Price:** \$319

4/10

Experience Pure Performance



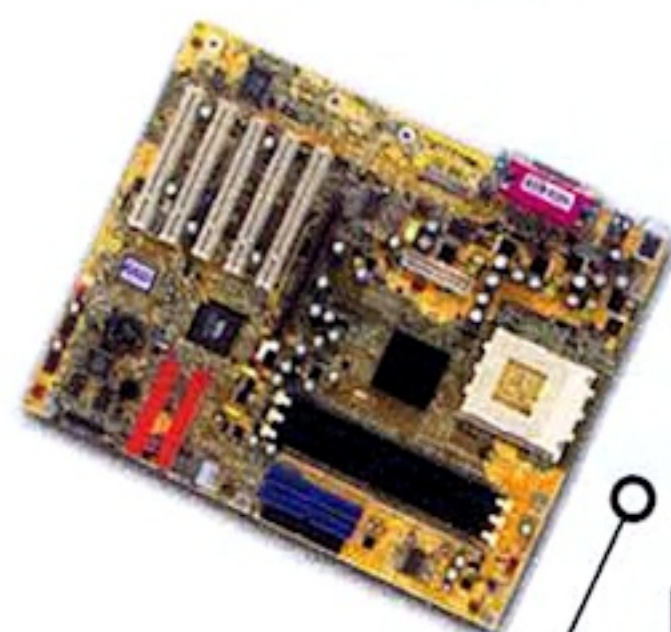
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ATA133 Ready

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- 5 PCI / 1 AGP 4x



ATA133 Ready

AD73 Pro



VIA® KT266A /Socket A /ATX

- Supports Socket A for AMD Athlon™ / Athlon™ XP / Duron™ 200/266MHz FSB CPU
- 3 DDR DIMM Sockets for PC2100 (DDR266) / PC1600 (DDR200)
- Memory capacity up to 3GB
- Supports ATA133/100/66/33 hard drives
- AC'97 Supported
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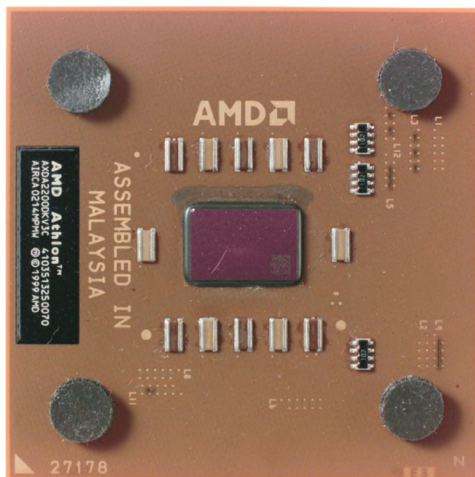
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Athlon XP 2200+

Die! Shrink! Hop onboard the Thoroughbred with John Gillyooly.



In the past, the introduction of a new core for the Athlon has met with much rumour, innuendo and excited hopping around from performance buffs. Both the venerable Thunderbird and the more recent Palomino cores added enough tweaks to make the Athlon an even tastier option for us speed freaks.

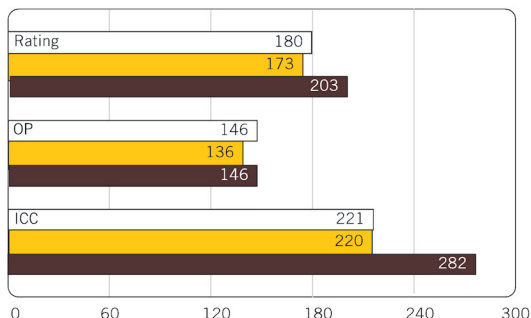
Apart from some short-lived crazy talk online about the new Thoroughbred core featuring everything from 512KB L2 cache to SSE2 and a 166MHz FSB (all these rumours were quickly shot down), the level of excitement just hasn't been the same. Thoroughbred is merely a die shrink of the Palomino core to a 0.13-micron process, without the cache boost that accompanied Intel's Northwood die shrink of the Pentium 4 or the added features that the Palomino brought to the table.

According to AMD's roadmaps, the next Athlon core, codenamed Barton, is slated to include the increase to 512KB L2 cache, however the future of the Barton core is up in the air. By the time it launches, the Athlon will have moved over to the Clawhammer x86-64 core, which will take over both the Athlon role and name as a desktop CPU and relegate the Barton to the level of budget CPU.

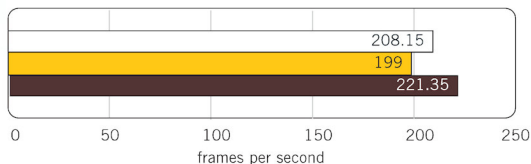
Debuting under the Athlon XP 2200+ name and running at 1.8GHz, the Thoroughbred core is noticeably different from the Palomino. It is tiny, measuring 7mm x 11mm as opposed to the Palomino's 11mm x 12mm. This is a huge cause for concern, considering that the Athlon is already notoriously fragile when mounting the whopping great lumps of copper that pass for heatsinks nowadays. Intel got around this fragility by using large integrated heat spreaders for the Pentium 4 and Tualatin cored Pentium 3 processor, but it now appears that we will not be seeing AMD using them until the launch of the Hammer family later this year.

To test the performance of this new core, we dropped the Athlon XP 2200+ into our standard testbench, which required only a BIOS flash to get it up and running. The CPU was then tested using SYSmark2002 and Quake 3: Arena, and the

SYSmark2002



Quake 3: Arena CPU



□ Athlon XP 2200+

■ Pentium 4 2.2GHz

■ Athlon XP 2100+

results compared to the Palomino cored Athlon XP 2100+ and the 400MHz FSB version of the Northwood 2.2GHz Pentium 4. The results are resoundingly underwhelming. The Thoroughbred core delivers the same incremental performance gain that would be expected from a Palomino running at 1.8GHz. In both Quake 3 and the overall SYSmark rating this translates to a 5% boost in performance. When we compare the Athlon XP 2200+ with the 2.2GHz Pentium 4 we see a much larger performance gulf developing. In the SSE2 friendly SYSmark2002, the 2.2GHz P4 is 12% faster than the Athlon XP 2200+, while in Quake 3 the gap is 6%.

Thoroughbred delivers neither a performance revolution nor an evolution. Apart from the increased fragility that comes with the smaller core size, which is becoming a major concern as heatsinks get bigger and heavier to accommodate increasing heat output, there is nothing to differentiate it from the Palomino core. It is still the same Athlon XP that we know and love, even if it is dropping behind the Pentium 4 in the performance stakes, but wait until the end of the year when AMD's Clawhammer will strike the next blow in the CPU war. ○

SPECIFICATIONS

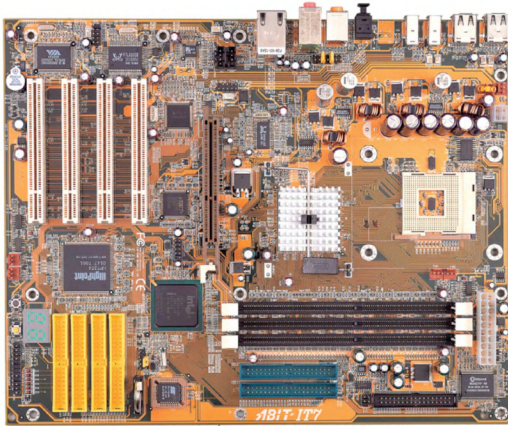
Socket A; Thoroughbred core; 0.13 Micron process; 128KB L1 Cache; 256KB L2 Cache; and 1.8GHz clock speed.

Website: www.amd.com

Supplier: AMD www.amd.com

ABIT IT7

The past sucks. Take a step into the future with John Gillooly.



There are two inevitabilities in this world: the first is that any good idea drags on way past the point of usefulness, and the other is that whenever a group of people get together to talk about *Big Brother* banality will ensue. In the interest of sanity, let's just forget about the latter and focus on the former.

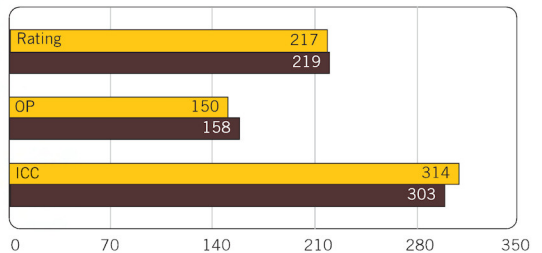
After a slow start, USB has finally reached critical mass, with a wide range of devices available that use the interface, and this fact alone means that the Serial, Parallel and PS2 ports are more or less redundant (unless that dusty old Dot Matrix printer really means that much to you).

As we saw with the VIA KT333 based Athlon board, the AT7, last month, ABIT is making a concerted effort to push towards a legacy free environment with its MAX technology, and the second step on that path is the new IT7 board.

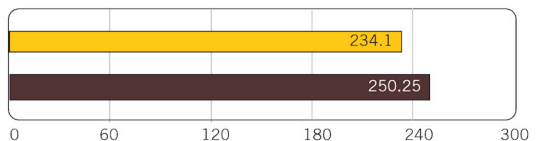
Based upon the new i845E chipset, the IT7 has many similarities with the AT7. Instead of those chunky Serial, Parallel and PS2 ports on the back of the board, it has two IEEE1394 ports, six channel audio output, Optical audio out, integrated 10/100 Ethernet and six USB ports. Like the AT7, it also uses a Highpoint HPT374 controller for four channel ATA133 RAID.

But the IT7 sports even more functionality than its VIA KT333 based sibling. Most of these added functions are pretty evident when you glance at the two boards. Due to the arcane idiosyncrasies of mobo design, ABIT has managed to squeeze four PCI slots onto the IT7, up from the three slots found on the AT7, and thanks to a combination of the integrated USB2.0 that is found in the i845E's ICH-4 Southbridge and the onboard VIA USB2.0 controller, all six USB ports are USB2.0 compliant (but don't fret, USB2.0 ports are fully backwards compatible with USB 1.1 devices). The IT7 also sports the LED POST readout used on some previous ABIT P4 boards, like the TH7-RAID, alongside the testbench friendly onboard reset and power microswitches.

SYSmark2002



Quake 3: Arena CPU



■ MSI 845E

■ IT7

We tested the IT7 using a 2.4B GHz Pentium 4 (for differing models of the same speed, Intel are using A and B as suffixes. 'A' denotes a 400MHz FSB Northwood, and 'B' denotes a 533MHz FSB Northwood core) with 256MB of PC2100 DDR RAM. The results have been compared to the same set-up running in MSI's 845E Max2 motherboard. We tested with SYSmark2002 and Quake 3: Arena using CPU settings.

Considering the fact that both the boards use the same chipset, it's unsurprising that there is minimal difference between the two. The IT7 just scrapes ahead in the overall SYSmark2002 results and Quake 3: Arena. While the difference seen in the SYSmark2002 results is negligible and more a product of the background fuzz inherent in any benchmark, the 6% difference shown in the memory sensitive Quake 3 benchmark can be ascribed to the plethora of memory tweaks that reside in the IT7's Softmenu III enhanced BIOS.

Even though the IT7 has enormous potential for tweekage, especially when paired with good quality DDR RAM, the big advantage of it over other i845E boards stems from the legacy free design and included features, a move that ABIT should be commended for. The time is right for us to stop looking backwards and start moving forwards with our PCs, and the IT7 gives P4 fans the perfect platform for this move.

SPECIFICATIONS

Intel 845E chipset; six USB 2.0 ports; two IEEE1394 ports; six channel audio with Optical out; and four channel IDE RAID.

Website: www.abit.com.tw

Supplier: Synnex www.synnex.com.au

Phone: Synnex 1300 880 038 Price: \$440

9.5/10



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GAMES



Plenty of gaming goodness

Bennett Ring finally gets to live his childhood dream of visiting E3 and all he brought us back was this lousy column.



Ever since I was knee high to a control pad, I've felt the burning desire to travel to the outrageously expensive US city known as LA, not to bask on the beautiful coastline or to stroll down Hollywood Boulevard, but to stand transfixed in front of a giant screen for hours at a time at the gaming Mecca known as E3.

After getting over the fact that Los Angeles is actually the arsehole of the universe, and not the picture-perfect, glam city portrayed in every second American mini-series, I found my way to the LA Conference Center. And there I learnt the meaning of the word big. Big signs, big display screens, big queues and big security dudes. But most of all, it was all about big games.

You don't realise just how much money is involved in the games industry until you go to E3. Reading a press release saying Microsoft has spent X billion dollars on promoting its new console is one thing, but seeing a life sized Spitfire replica hanging from the ceiling over the Combat Flight Sim 3 booth, right next to three forty-foot statues of mythological gods, brings a new realisation about just how much money gets pumped into gaming these days.

In terms of big announcements, there were surprisingly few. I hate to sound totally Xbox-centric but the biggest, and perhaps only, news had to be Xbox Live, the online service for the Xbox. Thanks to a billion US dollars and the Xbox's inbuilt Ethernet adaptor, it's going to be

hitting the Net this September in Europe, Japan and America. A firm date for Australia wasn't announced, but we're hoping that the usual Australia=Europe rule applies for this launch. Heck, we'll even slay a few goats to the gods of multiplayer to make sure it happens.

To counter this, Sony mentioned the fact that it is hoping to go online towards the end of the year, but that's about as solid as its details got. Nintendo is going to be the only console to cater for the dialup online gamer with its GameCube, which will probably help sales to those who can't afford or don't have access to broadband. This is a good thing considering the lackluster line up of GameCube games that were on display. There were a few GameCube nuggets o' joy, but not enough to inspire confidence for the platform in this gamer's mind. Who knows though, because brand loyalty can be a mighty powerful factor.

And to be honest, that was just about it. But just because there weren't any Earth shattering announcements doesn't mean there weren't any mind-blowing games. It just took a while to sort through all the crap to find them. As you'll see from our E3 roundup, there are indeed some fine games waiting to be played this coming Christmas, the vast majority of which involve copious amounts of blood and/or bullets, which is always a good thing. Unless you own a Nintendo, that is.

First Person Shooters still appear to be flavour of the Millennium,

although massively multiplayer games seem to be continuing their stratospheric rise in popularity. Just don't expect the multiplayer games to be coming out as soon as their singleplayer counterparts, due to the massive amounts of time that must be invested into making a virtual world seem real.

To find out which is the current developer's platform of choice, I asked every developer I met this very question. The PS2 is still seen as a complicated bundle of silicon to program for, although many developers are finally comfortable with the parallel nature of its hardware. However, due to the massive installed user base of the PS2, it is still the number one platform in terms of game releases. Apparently the GameCube isn't much easier to program for, despite Nintendo's claims to the contrary. As you have probably already guessed, the Xbox was easily the most loved platform by developers, combining the power of the PC with the standardised hardware of a console.

It's plain to see that the Xbox owned this year's E3, but this doesn't mean the story will be the same next year – right now it's got the benefit of having very current hardware, but it might start to lag in terms of processing oomph behind the PC over the next 12 months. So don't go selling that beige box you've got under your desk so you can stock up on console goodies. And with the PS3 not too far away Sony might once again regain its dominance as console king. So, in a nutshell, E3 r0x0r3d my b0x0r5, but my only regret is that I didn't get to live through the quintessential experience of an LA car jack, other than during a brief demo of the PC version of GTA3. □

'...the vast majority of which involve copious amounts of blood and/or bullets, which is always a good thing.'



PlayStation 2

TAKE SOMEONE SPECIAL OUT



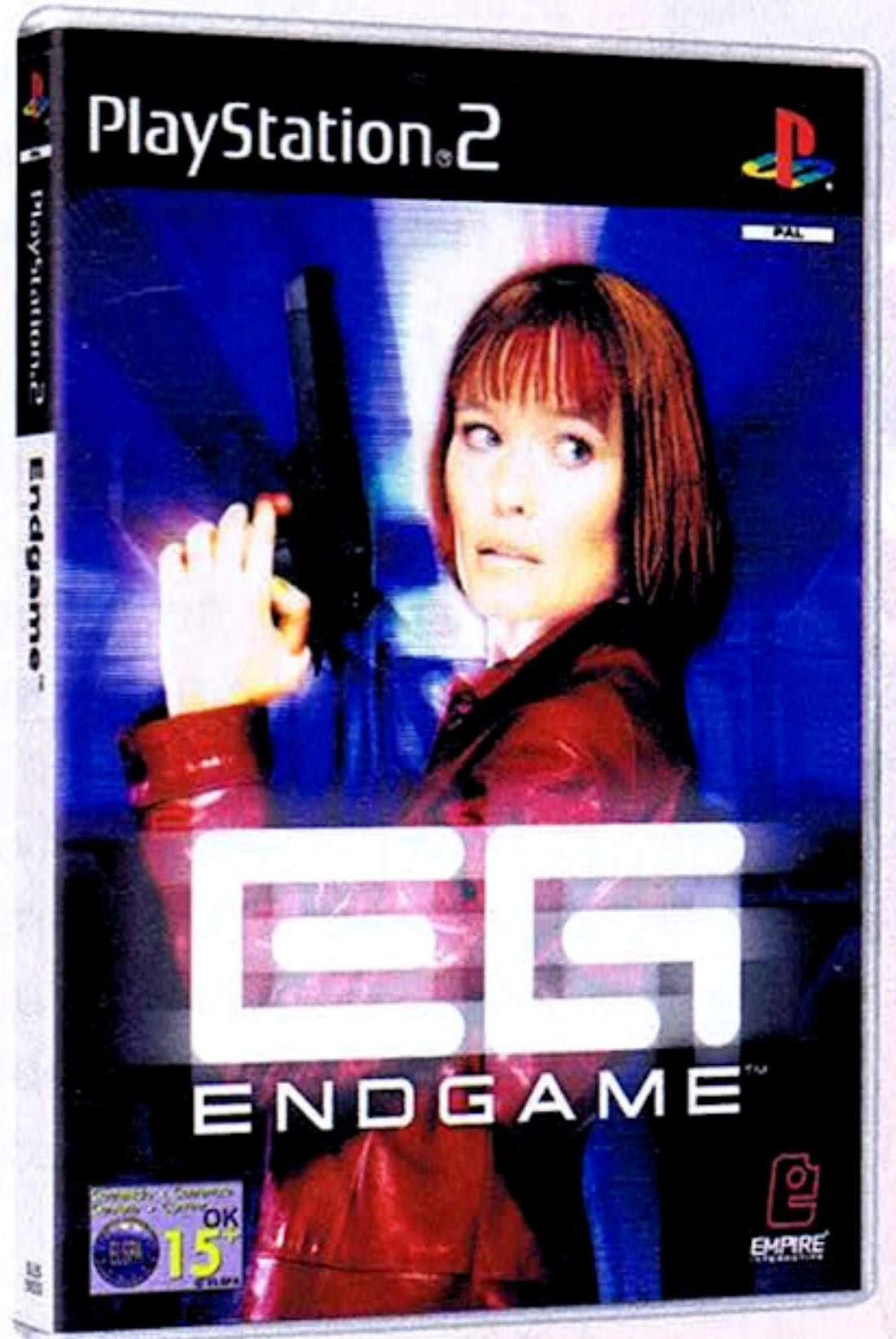
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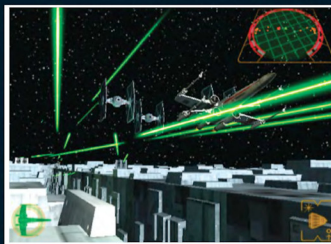


Star Wars Rogue Squadron II: Rogue Leader

'Help me Obi-Wan Kenobi!' pleads Des McNicholas.



ABOVE: Troopers advance in backwards mode.



ABOVE: Simple HUD leaves room for the action.



ABOVE: Rogue Leader boasts outstanding detail.

Criticism of *Star Wars* games has been a little tough over the years, even if partly justified by some blatant attempts to cash in on the franchise. In many ways, we were spoilt by standout titles like *X-Wing* and the original *Rogue Squadron* on the Nintendo 64, both of which showed what committed developers could do. In *Rogue Leader*, developer Factor 5 has produced an outstanding tribute to *Star Wars* that throws players back into the heart of the original movies, with cinema quality graphics, terrific action, and a host of old friends. Along the way, Factor 5 has also managed to demonstrate just what Nintendo's new beast can do – and it's all good news!

Unsurprisingly, the premise of *Rogue Leader* is fairly straightforward: players take the lead in a squadron of the Alliance's top-gun pilots, tackling a series of long, multiple objective missions in the far reaches of space. The campaign is short at just ten primary missions, but a few more can be unlocked and a bonus point system adds to the replay value and overall challenge. There's plenty of variety, with objectives including freeing prisoner, using speeder tow cables to take down AT-ATs on Hoth, (of course!) destroying Death Stars. *Rogue Leader's* disc is also stacked with hidden bonuses, including commentaries, a making-of documentary and a picture gallery; although none of them quite make up for the lack of multiplayer options.

Rogue Leader comes with a good mix of

ships to fly, each with some unique characteristics. The X-wing is the basic work-horse, complete with four laser cannons, proton torpedoes and an R2 unit to take care of any damage; after which players can progress through the alphabet with the Y-wing fighter-bomber, the super-fast A-wing, the capital ship busting B-wing, and the famous little Aircorper. Bonus points unlock a few others, including Imperial Shuttles and TIE-fighters, and the flight models are good enough to make the handling difference noticeable. Upgrades include improved lasers, bombs, missiles and torpedoes, capped off with an advanced, powerful targeting computer.

Factor 5 has done a terrific job with *Rogue Leader's* control interface, taking full advantage of the GameCube's extra gamepad options. Acceleration and firing are straightforward, but the system also includes some well-developed combinations for rolls, Wingmen commands and camera views. Each ship has a well modelled cockpit, and a toggled targeting computer is available for those times when The Force isn't with you. In a nice touch, S-foil wings need to be re-opened after accelerating in the X-wing and B-wing fighters, or players will find themselves with an embarrassing lack of lasers! The uncluttered HUD includes a simple radar display, with objective and target information; a communications display for commanding your wingmen, ground troops

and the R2 unit; and neat damage and weapon indicators.

From the very first mission, which recreates the final Death Star scene from the original film, *Rogue Leader* is authentic *Star Wars* all the way. Most of the intricately modelled environments will be instantly recognisable to fans, and the scripts and voice acting are spot-on. Despite jumping in a little unexpectedly at times, the cutscenes are first-rate, and players will be very impressed with the cinematic feel of the in-game graphics.

John Williamson's score has never sounded better, particularly for players with surround sound, and everything from explosive battle effects to the roar of TIE-fighters streaking past is nicely presented.

Star Wars Rogue Squadron II: Rogue Leader is an outstanding *Star Wars* title that does a remarkable job of staying true to the franchise. This is a solid space-sim in its own right, but it's the complete *Star Wars* experience that will attract and hold a player's interest. The relatively short campaign and the lack of multiplay are a little disappointing, but this is among the best of the GameCube launch titles.

9/10



GAME DETAILS

FOR: *Star Wars* at its best. Excellent sights, sounds and atmosphere. First-rate control interface, and a good bonus system.

AGAINST: Cumbersome tutorial; no multiplayer and a short campaign; and it's available only on GameCube, dammit!

DEVELOPER: Factor 5 and LucasArts www.lucasarts.com

PUBLISHER: Electronic Arts www.ea.com.au

DISTRIBUTOR: Electronic Arts www.ea.com.au

PHONE: Electronic Arts (02) 9264 8999

V8 Challenge

Nothing pulls like V8, claims George Soropos.



ABOVE: And the race is on!



ABOVE: Time for a trip to the panel beaters.



ABOVE: The engine handles long distances well.

We've had to endure some rather embarrassing false starts along the road to getting a decent V8 Supercar racer for the PC, but thank Brock it's finally here. The Yanks and their NASCARs can keep going round and round in circles until Disney Land becomes a religious retreat, because we all know that our V8s are better.

Oddly enough, V8 Challenge wasn't developed here in Oz. It was made by a Swedish company, Digital Illusions, which began its life in 1992 making Pinball games for the Amiga. It was responsible for the PSOne/PC racer Motorhead a few years back, and more recently for the truly excellent Rallysport Challenge on the Xbox. Considering their prior racing game experience, is it any surprise that V8 Challenge has proven to be an above average racer?

V8 Challenge offers nine circuits, including Bathurst, Melbourne, Adelaide and Sandown. The other five are fantasy tracks and unfortunately there is no Eastern Creek or Oran Park – though some would argue that's no great loss. The tracks are quite well detailed and realistic in their design and placement of trackside furniture.

There are quite a few Bathurst tracks around for GP3 and other games but the version here in V8 Challenge is the best yet as it most accurately, if not

completely, represents the elevation of the mountain section of the circuit.

The cars on offer represent most of the racers competing in the official V8 Supercar competition with one notable exception being Craig 'the traitor' Lowndes and his black and silver Ford. We suspect legal issues, or maybe ego issues, are to blame. The V8 utes or Brutes as they're known are also included to spice things up.

So how do they handle? Well unfortunately GP3 it certainly ain't, but if you're not obsessed with super accurate, super anal physics models you'll find the car handling in V8 quite acceptable. It feels a little bit like TOCA 2, with less twitchiness and a better footing for the cars.

Variable weather conditions add some unpredictable behaviour, but it's still within the limits of believability. There is an extensive range of tweaks for your car including helpful explanations of the effects that each change will have on its handling. One unique graphics option, which seems to have been inherited from the first person shooter genre, allows you to adjust your field of view from 80 upwards, allowing you to get more peripheral vision on screen.

The level of difficulty varies widely and should please everyone from the novice to racing legend. However you

should be careful at the start of races if you're not near the front of the grid because there is always a prang or pile up – an obvious fault in the AI. The game's over excited race officials are also a bit of a bummer, as unavoidable bumps and accidents caused by other vehicles can often lead to a stop-go penalty being dumped on you for no apparent reason, bah humbug!

The only other notable problem is with the audio, which tended to drop out at random running on an SB Live! card with the latest drivers, so hopefully a patch will have fixed this problem by the time you read this.

V8 Challenge is a lot of fun as a multiplayer game due to the adjustability of the driving experience and the nature of the V8 Supercars themselves. They don't fly apart at the first touch like fragile F1 cars and they offer something we Australians can relate to: the age old Ford versus Holden feud!

So there you have it, it took a bunch of Swedes to bring us our first fully localised racing title. I don't know if we should be glad or embarrassed. □

8/10



GAME DETAILS

○ **FOR:** Local flavour; Bathurst circuit; and fun multiplayer.

○ **AGAINST:** Buggy sound; excitable race officials; and made in foreign parts.

REQUIREMENTS: Pentium II 350; 64MB RAM; 500MB HD; DX 8.1; and 8MB GFX.

RECOMMENDED: Pentium III 1GHz+; 128MB RAM; 64MB GFX; and wheel.

SOUND APIS: DirectX 8.0 **VIDEO APIS:** DirectX 8.0

DEVELOPER: Digital Illusions (DICE) www.dice.se

PUBLISHER: Electronic Arts www.ea.com

DISTRIBUTOR: Electronic Arts www.ea.com

PHONE: Electronic Arts (02) 9264 8999

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Might and Magic IX

Ashton Mills pools his might to tackle the magic of M&MIX.



ABOVE: Never trust a squatting kitty. . .



ABOVE: Play Paper Doll dress-up party with Belia!



ABOVE: Stunning dialogue – you won't find better!

You would think that after all the sequels and the spawning of a host of ancillary productions, including Heroes of Might and Magic, that M&MIX would surely size up to be a fantastic adventure.

Ack, no. Just like Gandalf failing to hang on after his battle with the Balrog, it stops rather short of being a good game, and falls into the pit of banality.

Even a transition to the Lihtech engine can't save M&MIX from its fate. Despite the use of some quality textures throughout the game the environment is still simplistic and at times bland, more like an illustrated story book than an immersive world to lose yourself in. And the resolution can't be increased past 800x600, even if you tweak the ini file.

'Course there's the age old argument that RPGs are more about gameplay than looks, but as you no doubt have seen by now Morrowind changes all that – and perhaps, even, spoils us. Regardless, M&MIX doesn't even have gameplay to fall back on. Frankly, it's sleep inducing.

The background plot is of the usual adventuring fare: unite six disparate clans spread across the land of Chedian and then stop an invading army through less-than-liberal use of extreme prejudice and excessive force. Some of the quests are simply inane or boring – and sometimes, they are both. But what lets the game down is the lack of attention to detail and depth.

NPCs, integral to any RPG, do silly things like stare at walls for long periods of time or carry out conversation gestures with a cat instead of other NPCs. Speaking of which, NPCs have nary a sentence to say to you in your interactions, even when receiving quests! It's clear the developer team had no passion for dialogue, and this really kills the game as there's just no atmosphere or sense of involvement in the plot.

While fighting has been improved with enemies using AI to outflank you, it's still about as satisfying as the pithy conversations with NPCs. In many ways M&MIX is closer to FPS than RPG here – you literally line up your crosshairs on a critter and thwack mouse 1 until you die or they do. But there's no indication as to the effectiveness of a strike except a damage report at the bottom of the screen. No weapon animations, no splashing goo from wounds, nothing until they suddenly die and sink immediately into the ground. Totally unsatisfying.

Your characters are formed from just four races – Human, Elf, Half-Orc and Dwarf – with no classes at the beginning. Instead, you focus on either one of the realms of Might or Magic. How your characters develop depends on how you allocate points at levelling up. Magic is divided into four schools – light, dark, elemental and spiritual – with each spell requiring aptitude in two schools. The effectiveness and result of a spell is dependent on the levels of the

schools involved, but while this is an interesting approach, it limits variety.

To its credit M&MIX does some things right: the quality and range of sounds are excellent, with footsteps sounding different on different surfaces; magic effects are sweet; some of the dungeons are very well laid out (outdoors can sometimes look a bit simple); and smart enemies will sometimes run off and get their pals before attacking.

Then there's the traditional M&M method of skill advancement – extra bonuses are achieved by hunting down teachers and paying for training to become an Expert or Master in a given skill.

Ultimately M&MIX just lacks the spit and polish of a finished product. The potential of the M&M series is let down by simple features either done poorly or missing altogether. New World Computing has flogged the formula for too long, and M&MIX just can't compete with other offerings currently available. Wizardry 8, undeniably its closest cousin, is leaps and bounds ahead simply because of its attention to detail. Realistically I doubt M&MIX will garner the pleasure of being on a gamer's hard drive long enough to meet the next scheduled defrag.

5/10



GAME DETAILS

○ **FOR:** It's Might and Magic. Umm, that's it.

○ **AGAINST:** Lacks depth & attention to detail; simple for kids, but adults won't be challenged.

REQUIREMENTS: Pentium II 400MHz; 64MB RAM; 1GB minimum HDD; and 16MB video card.

RECOMMENDED: Pentium III 500MHz; 128M RAM

SOUND APIS: DirectSound **VIDEO APIS:** Direct 3D

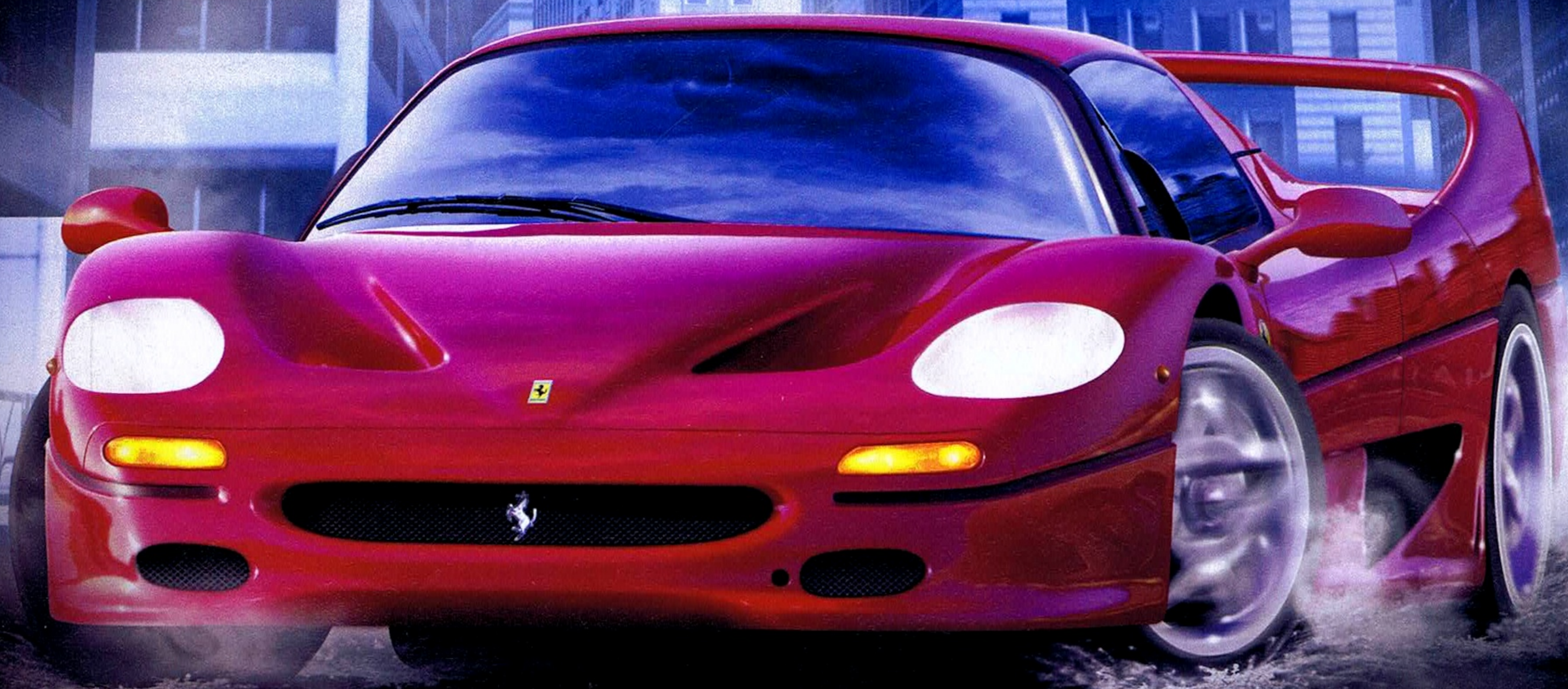
DEVELOPER: New World Computing www.newworldcomputing.com

PUBLISHER: 3DO www.3do.com

DISTRIBUTOR: Take2 Interactive www.take2games.com

PHONE: Take2 Interactive (02) 9482 3455

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Army Men RTS

George Soropos enjoys a bright'n'happy war.



ABOVE: Flame throwers in the garden bush.



ABOVE: Grunt-rushing the tower.



ABOVE: I never had tanks in my toy soldier box. . .

Army Men games have bred like rabbits over the years, particularly on formats that encourage casual, unprotected fraternising such as the Playstation. Army Men RTS is the first strategy title in the series and has been put together by genre veterans Pandemic of Dark Reign 2 fame. In the single player campaign game our old nemesis the Tans have taken the offensive, and won over one of our best commanders. Colonel Blintz has taken one too many to the head and now parades around his base wielding a Banana Chupa-Chup and a necklace of Green skulls. Your mission is to take him out.

Unlike RTS titles that pour on the unit types, Army Men retains only those classics found in every quality packet of plastic soldiers. Your infantry consists of eight unit types including the grenadier, the big bazooka man and the mine sweeper.

There are also eight vehicle types, and eight types of building. The Tank is the most powerful unit in the game but is vulnerable to the choppers, while the half track has both surface to surface and surface to air capabilities.

The most useful unit in the game is the medic jeep. It can heal any unit type from a reasonable distance away and is absolutely vital in maintaining momentum in an attack.

Better units are made available by

upgrading some structures like the HQ and Garage and there is also a group of special troops who become available as you progress through the missions. These are Sarge's own 'best of the best' and have better attack and defense capabilities than the other soldiers.

Army Men RTS isn't designed as a typical genre title with open maps. Each mission is designed with a 'pathway' that leads you through to your final objective, and past a lot of ambushes. This tends to take some of the strategy out of the game and makes it more a game of attrition, resulting in the side which can use its resources the most efficiently the winner.

Army Men RTS also rewards players with 'medals' if they achieve certain goals such as spending less than 4000 plastic in constructing their squad or finishing a level in under five minutes.

The resources which help to build your units come in the form of abandoned toys and other junk lying around the environment. You need both plastic and electricity, and both are harvested by your little toy Bulldozer which dumps them back at your resource depot once collected.

As well as the campaign game Army Men includes a 'Great Battles' section that has many unique and semi-historical missions to enjoy. Half of them are locked when you first start

playing and don't become available until you complete certain campaign missions and win a few medals.

Along with the cut scenes the Great Battles have given the developer the chance to inject a lot of humour into the game with some of them being recreations of childhood shenanigans. Shooting a line of soldiers off the bathroom towel rail for example.

Army Men's implementation of LAN and online play is simple but functional, and while there is only one game type – defeat the enemy at a certain cost – there are quite a few different maps to play on.

The low spec nature of the game makes it work very smoothly in multiplayer mode, depending on the speed of the server of course.

Without any mucking about, if you're looking for a cutting edge, high tech strategic challenge Army Men RTS ain't the one.

If however you are looking for a game to introduce a younger sibling to the RTS genre, or just to have a light hearted break from work, then it isn't too bad at all.

6.5/10



GAME DETAILS

FOR: Good introduction to RTS gaming; low specs; and rather amusing in small doses.

AGAINST: Not for the hardcore campaigner; few vehicle types; and basic AI.

REQUIREMENTS: Win95; Pentium II 233MHz; 64MB RAM; 250MB HD; and DirectX 8 video/audio.

RECOMMENDED: Pentium II 400MHz; 96MB RAM; and 32MB video.

SOUND APIS: DirectX 8.0 **VIDEO APIS:** DirectX 8.0

DEVELOPER: Pandemic www.pandemicstudios.com

PUBLISHER: 3DO www.3do.com

DISTRIBUTOR: Take2 Interactive www.take2games.com

PHONE: Take2 Interactive (02) 9482 3455

Soldier of Fortune II: Double Helix

First person shooter, or neurosurgeon simulator? Bennett Ring investigates.



ABOVE: That should get rid of the brain tumour.



ABOVE: Time to man the M60 door gun.



ABOVE: The jungle levels are the most impressive.

It seems that Raven just can't go wrong of late. Over the last couple of years it has established itself as arguably the premier developer of first person shooters in the world. Having a tight relationship with id Software, the highly respected game engine manufacturer, has no doubt helped Raven attain this status. But can the highly anticipated SOF2 live up to this reputation, considering the original was plagued by a myriad of problems, including dodgy AI and a lack of depth?

Raven has tacked a load of features onto the Quake 3: Team Arena engine, and the end result is one damn fine looking game. The most vaunted feature has to be the aptly named GHOU 2 rendering system, which allows you to decapitate, de-limb or just plain destroy the bodies of your enemies. Unless you want your kids to dream about their parents' brains being spilt all over the breakfast table, you'd do well to keep them away from this title. Character models are very detailed – upwards of 3,000 polygons – as are the different environments you'll be stomping through on your path to death and destruction. These environments are also chock-full of destructible items, which are usually strategically placed between you and the enemy.

To run this game at maximum detail you're going to need the modern day equivalent of HAL9000, because even on an Athlon XP 2200+, GeForce4 Ti4400 with 512MB DDR-RAM a couple of the scenes dropped to

around 20 frames per second. Unfortunately some of the 'enhanced' effects aren't pulled off quite as well as we'd have liked, with the environmental effects being a notable example. In a nutshell, they just look plain wrong. On the upside, the vegetation effects are second to none – it's just a pity they don't add anything to the gameplay, as the enemy AI can see you even when you're lying prone in the middle of a dense patch of grass.

Speaking of the AI, the enemies in SOF2 are as similar to those in the original as Sir Isaac Newton is to Big Kev. This time around they'll react to sound, hence the inclusion of a sound meter that lets you know just how much noise you're making. Flanking and cover manoeuvres are also in their repertoire, and now they'll finally react to a buddy's intestines being blown all over them. However, the enhanced AI occasionally acts as if it has just popped some super strong acid by throwing grenades in the totally opposite direction and assorted other screwy behaviour. And the fact that it can see you through thick vegetation, walls and obstacles, while making the game much harder, just seems cheap. It also negates the use of stealth: you're much better off just blasting through everything in sight than trying to sneak around.

In terms of storyline, the use of many laborious, non-action scenes quickly becomes boring, but overall it does help to build a fairly deep back-story. Just like the superior MOHAA, 'novelty' levels are included

in SOF2. The best of these sees you manning the door M-60 in an Iroquois chopper, taking out small villages to the tune of *Ride of the Valkyrie*. While the singleplayer does have its share of flaws, don't think it isn't a hoot to complete – provided you enjoy copious amounts of violence, blood and weaponry.

Naturally, the game doesn't end with singleplayer, as the multiplayer mode is almost as deep as the singleplayer. The revolutionary random map generator works well by ensuring players don't have an advantage by knowing the maps inside out, although the resulting maps each have a similar layout. The usual deathmatch, team deathmatch and CTF modes are included alongside Infiltration, which is basically an exact copy of Counter-Strike's hostage missions, minus the infuriating hostage AI. Client side prediction has been tacked onto the Quake 3 netcode, and appears to work very well, although we only got to play the game on an ADSL connection with a respectable 40ms ping.

While SOF2 does contain a few irritating flaws, in the end it's still an enjoyable, albeit incredibly gory, blast fest. It's just a pity that it doesn't quite live up to the high standard we've come to expect from Raven.

8.5/10



GAME DETAILS

FOR: Gorgeous engine, blood, guts and big guns; and improved AI.

AGAINST: Occasional bouts of AI madness; and gameplay a bit 'same old, same old'.

REQUIREMENTS: 450MHz CPU; 128MB RAM; and OpenGL compatible video card.

RECOMMENDED: 1.5GHz CPU or better; 64MB GeForce3 or better; and 256MB+ RAM.

SOUND APIs: DirectSound; **EAX Advanced HD VIDEO APIs:** OpenGL

DEVELOPER: Raven www.ravensoft.com

PUBLISHER: Activision www.activision.com

DISTRIBUTOR: Activision www.activision.com

PHONE: Activision (02) 8876-5700

Tactical Ops: Assault on Terror

By now John Gillyooly knows all there is to know about counter-terrorist operations.



ABOVE: The UT engine equals rich environments.



ABOVE: Maps span a range of locales.



ABOVE: The rescue the hostage scenario returns.

Every so often the Net spawns something so unexpected and amazing that it becomes a phenomenon in its own right. Driven by the interaction that the Net brings, and the ready audience it creates, the mod scene is one such phenomenon. What started as user created additions to existing games has blossomed over the years into community created games that bear little resemblance to the retail products that they overlay.

As we all know, life comes full circle, and over the past year or so several mods have spun off into retail titles themselves. The most famous of these is Counter-Strike, which stands as a game that redefined how we look at online gaming. While it's by far the most widely known, there are many other worthy titles that have emerged from dedicated mod teams. One is Tactical Ops: Assault on Terror, designed as a Counter-Strike style mod for Unreal Tournament, and now a fully-fledged retail title.

It bears obvious similarities to titles such as Counter-Strike, and Crave's recently released Global Operations. The similarities are striking, to say the least: it adopts the now familiar 'terrorists vs. counter-terrorists' round-based gameplay model, a monetary system for the purchase of weapons and a swag of objective based maps. And this is not too surprising, for the mod was very much an attempt to bring the growing phenomena that was Counter-Strike to the superior Unreal Tournament engine.

Where Tactical Ops: AoT differs from

those other titles is that it makes no pretence of realism above and beyond the scenario and weapons. Players move at blinding speed, make ridiculous leaps and games turn into something more like the deathmatch of old rather than the intended achieving of objectives. This is both evident in the botmatches that pass for the single player component of the game, and the online action of the game's true focus.

The game features 27 weapons either found in each level, or purchased using money earned through kills and wins – just like Counter-Strike. Extra money is one of the unique features of the game. When killed, players drop a certain amount of cash that can be picked up by running over it. Similarly, maps have occasional piles of 'dirty money' or drugs, which can be picked up for a nice cash bonus at the end of the round. Each side has a different suite of weapons available, and the buy screen only shows the weapons that a player can afford at the time. Helmets, vests, thigh pads and night vision goggles can also be purchased.

Game designer, Kamehan Studios, has stated that the game will be playable online against the mod version, allowing for a wider server base than an exclusive title will have. Unfortunately at the time of writing, finding a server was very much a hit and miss affair, as the patched retail 3.15 version had huge problems when trying to converse with the 3.15 mod version of the game. There are far more mod servers out

there than retail ones. Hopefully this issue will soon be rectified, because it is exacerbated by the fact that the in-game server browser is completely unable to distinguish between the two.

It is this schism between the mod version and the retail version that is the ultimate undoing of Tactical Ops: AoT. While it is one of the better mods on the scene, and the fast paced twitch gameplay will appeal to those who want a more immediate experience than the slower competing titles, it feels somewhat hollow as a retail title. Online servers appear to be mainly running custom maps, and the single player botmatch component is certainly nothing to write home about.

A few years ago, Tactical Ops: AoT would have been an impressive title, but with the sheer volume of quality tactical shooters on the market it pales in comparison. Add a minimal feature set and over simplified gameplay and Tactical Ops: AoT feels more like an attempt to cash in on the craze than a mod deserving a wider audience. It's fun for a quick blast, but for those of us wanting something more than that, it fails to leave any lasting impression.

6/10



GAME DETAILS

FOR: Fast action hit for the twitch gamer; and solid online support base.

AGAINST: Lacks depth; retail-mod incompatibilities; and adds nothing to a crowded genre.

REQUIREMENTS: 200MHz CPU, 64MB RAM, 8MB 3D card.

RECOMMENDED: 500MHz CPU; 128MB RAM; 32MB 3D card; and broadband Internet connection.

SOUND APIS: DirectSound **VIDEO APIS:** Direct 3D; Open GL

DEVELOPER: Kamehan www.kamehan.com

PUBLISHER: Infogrames www.infogrames.com

DISTRIBUTOR: Gamenation www.gamenation.com.au

PHONE: Gamenation (02)9808 6800

Spider-man

Bennett Ring tingles all over after swinging through the city.



ABOVE: Aerial action is a key component.



ABOVE: Kapow! Bam! Crash!



ABOVE: Not a game for those scared of heights.

Unless a genetically altered spider has recently chowed down on your tasty flesh, chances are you don't have the ability to walk on vertical surfaces, shoot web from your wrists or toss pickup trucks around like ping pong balls. Which kind of sucks considering how cool these special powers could be, but the next best thing is here to placate your superpower needs: Spider-man for Xbox.

Spider-man is an agile superhero, and it's amazing that Activision has managed to include all of his signature moves into the game. There's the good old web swing, which is handy for getting past peak hour traffic jams and rescuing the odd damsel in distress at high altitude. Then there's the web zip, which can be used to pull you across distances at a rate much faster than your weakling legs could ever manage, or it can be used to bind the bad guys to the spot, making them an easy target for your pummeling fists of fury.

Of course, it wouldn't be a Spider-man game without the ability to walk on walls or ceilings. Combine all of these manoeuvres and Spider-man ends up being one of the most manoeuvrable game stars of all time, taking to all three dimensions with equal ease and dexterity.

At the end of the day it doesn't matter how agile Spider-man is, because being a dude in a shiny red spandex suit is really all about bashing things to smithereens. In this regard Spider-man also delivers the

goods, with a whopping thirty different combo manoeuvres. You'll start off with around seven of these combos, and then unlock the rest as you progress through the game's twenty four levels (two of which are exclusive to the Xbox version).

The power of the Xbox has been put to good use in Spider-man's graphics, as this is one very impressive looking game. Especially noteworthy are the outdoor levels, which incorporate soaring skyscrapers towering over busy streets, helping to impart a hearty sense of vertigo. Spidey's animations are all fluid and realistic, as are those of his enemies. Great use has been made of reflective effects, both on Spiderman's suit and the many skyscrapers he soars past. Due to the need to manoeuvre through three dimensions, the camera can get a little lost at times, but a couple of day's practice will soon see you in full control of the viewpoint.

To help you get used to the slightly overwhelming control system, over ten different tutorials are included. The voice acting for the tutorials is hilarious – it's just a pity that the lines in the main story line aren't quite as funny as these.

When it comes to gameplay, Activision has done a whole lot more than the standard 'Step 1: beat up bad guy. Step 2: find next bad guy. Step 3: beat up bad guy. Repeat.' Sometimes you'll have to take the stealthy approach, at others you'll need to get from point A to point Save the World in

the shortest possible time. One supremely cool level sees you using your spider sense to detect where innocent civilians are getting the utter bollocks kicked out of them. The many different mission types help to keep the game feeling fresh the whole way through.

While everything sounds rosy so far with Spider-man, there is a glaring problem with this game: its difficulty level. On anything harder than the easiest setting, it can be incredibly frustrating due to the lack of a mid-level save game feature. You'll often find that you keep getting killed at the same section in a level, after spending 10 minutes or so just to get to there. It's not uncommon to spend an hour or two trying to get past certain levels, which can lead to Xbox-throwing levels of frustration. But if you play it on easy, you'll find it very easy, enabling you to clear the entire game in less than a weekend of hard playing.

Apart from this niggling complaint, this game achieves what it set out to do – that is, to make you feel as if you really are Spider-man. It's just a pity that at the most enjoyable difficulty level it won't keep you busy for long.

8.5/10



GAME DETAILS

FOR: Gorgeous to look at; deep control system; nice variety of missions, you ARE Spider-man!

AGAINST: On easy difficulty the game is too short; on normal or above it becomes frustrating.

DEVELOPER: Treyarch www.treyarch.com

PUBLISHER: Activision www.activision.com

DISTRIBUTOR: Activision www.activision.com

PHONE: Activision (02) 8876 5718

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Boom crash soap opera

We can't legally call Dan Rutter 'Doctor Dan', because he's not qualified as such, as far as we know. But for the services he provides, we think he's very Doctory indeed. LOTM can pack'n'stack a BLACK Debut case from www.dilithium.com. Happiness.




i IOOTM: Promedia plugging

Could you tell me if I buy a set of Klipsch ProMedia speakers from North America via eBay, will they be compatible to our power outlets?

David McMahon



ABOVE: Step-down transformers let you run US appliances in Australia, but one powerful enough for a decent set of speakers won't be cheap.

 Nope. Different pins, different voltage. You can run US


appliances from Australian power with a step-down transformer, but the price of a transformer powerful enough to run your speaker system, plus the amount of money you'd have to pay to get the things here, plus the GST you'd stand a good chance of having to pay as well, would certainly cancel out any savings.

i **Slow ripping**

I have a Diamond Data 36x CD-ROM drive that works fine for most applications, but I cannot for the life of me get it to rip audio CDs to .wav files above about 2.5x. This seems ridiculously slow, even given the parlous state of the rest of the box (200MHz Pentium, non-UDMA hard drive). Using Exact Audio Copy I can get a perfect quality rip, but only at about 1.0 speed. Audiograbber will do about 2.5 speed, but at terrible quality. I have upgraded the CD-ROM firmware, driver, and flashed my motherboard BIOS with no success. I have also fiddled with all drive settings in System Properties and EAC with similar results.

It is obviously not an earth-shattering problem but it is bugging the hell out of me. Any help would be highly appreciated!

Matt Taylor

 The general consensus about this seems to be that most if not all Diamond Data drives just aren't very good. Well, not for audio ripping, at any rate.

I don't know whether this'll work or not, but it has been unreliably suggested that if you try ripping right after closing the drive door – while the drive's still doing its new-disc spin-up routine – you may get much better performance. Or you may not.

It's cheaper to try this than to buy a new CD-ROM drive, anyway.


i Dead drive?

It all happened when I tried to format. I got the 98 boot disk and booted with CD-R support. Got into FDISK and deleted primary DOS partition. All fine and well – deleted. I then recreated the primary DOS partition and it came up with the normal 'restart and format' screen, all fine and well.

Now the next part is a bit of a blur but I'll try to re-create it. I inserted the Windows ME disc and restarted. It came up with the normal screen asking what I wanted to do: start WinME install; boot with CD-ROM support; or boot without CD-ROM support. I picked the Install ME option. It got in and I think there was an error or something so I decided to restart. Suddenly I couldn't get into setup, so I tried to run FDISK again. And all it came up with is 'no fixed disks found'. And in the BIOS it says there is no primary IDE installed. I have tried auto-detecting the primary IDE device on startup but nothing happens. So you could say I am in a bit of a pickle :[.

My mate has suggested that it might possibly be a problem with FAT32 and NTFS?

Sascha Tufts

 Whatever it is, it ain't anything to do with the filesystem[s] you've been using.

I would surmise that your computer just picked that moment to suffer a hardware failure.

It's probably the drive, maybe something on the motherboard, and conceivably something else. If the basic BIOS drive detection can't find your drive, and no cables have been yanked, then that drive has probably just decided to become a paperweight.

You can check this, of course, by trying the drive in a different computer, or a different drive in your computer.

i Dual XPs and homicide

I recently had an argument with a fellow computer geek while playing a game of Counter-Strike – something I believe to be a new phenomenon.

The argument was over AMD Athlon XPs. This particular person was convinced he was purchasing a dual XP system. I on the other hand was convinced that it was not possible to have dual XPs as they do not support proper SMP.

He continued by saying that ASUS made a motherboard specially built for XPs, but I ended the argument by placing a piece of lead in his brain base with a Steyr Scout.

Although I won the argument on the day, I would still like to know who was actually right.

Simon McLean

O You may have had the might, but you weren't actually right.

Athlon XPs are likely, but not certain, to work fine on many dual-CPU Socket A boards.

So are Durons, for that matter.

The difference between the XP and the MP is that the MP is certified by AMD to work in multiprocessor configurations, and the XP isn't.

There is a real difference beyond what's printed on the processor and guaranteed by the manufacturer: people fooling around with the early Tyan dual Socket A boards found considerably more... quirks... when trying to make XPs and Durons work than when they used MPs.

There are other dual boards around now, which have better XP compatibility, but the MP certification does still mean something.

If you're doing something mission-critical, drop the extra dollars on proper MP chips.

If you're feeling adventurous, though, all of the newer dual Socket A boards (including the ASUS A7M266-D about which your friend was presumably thinking) seem to stand a good chance of working with dual XPs.

That all said, the reality is that dual AMD Athlon XP compatibility is still an unofficial feature.

i Verti-drives

I forgot if it is OK to mount HDDs on their side. Is it?

Steven Sorrell

O Yes, it's fine.

In the olden days, hard drives had to be operated in the same orientation as they were low level formatted, because their stepper-motor-based head positioning systems would put the heads in slightly different places when you aligned the drive differently.

But modern drives can't be low level formatted, and their voice-coil-based positioning systems have feedback that lets them compensate for gravity in any direction. So they don't care what way round you install them.

i Overclocking query

I was wondering how to overclock an AMD Athlon 900 using a Gigabyte 7IXE4 motherboard.

I'd like some tips so I don't f**k it up too badly.

Alexander D Cooke

O Since that board doesn't have multiplier adjustment, there's no point in unlocking your CPU multiplier. All you can do is wind up the Front Side Bus from the stock 100MHz.

To do that, use the 'SW1' block of DIP switches, as documented on page 7 of the manual.

If you don't have the paper manual handy, you can download a PDF version of it from:

www.gigabyte.com.tw/support/msocketa.htm

There's no CPU core voltage adjustment on the 7IXE4, but its FSB adjustment only goes up to 115MHz anyway (1035MHz, from your CPU), so it wouldn't make much of a difference.

i UDMA unavailable

I've got a P4 machine with an SIS 650 chipset (ASUS P4S333-VM). I've spent roughly eight hours finding out that Ultra DMA mode doesn't seem to work with this motherboard and my spiffing Seagate Barracuda.

I was wondering if this is because of the MB/HDD combo or is it just a shitty chipset, and if this is a common problem, and would I be wrong to assume that a third party IDE card like the Highpoint RocketRAID 133 would fix the problem?

Oh, even though this 'feature' is not mentioned anywhere on the ASUS site, the BIOS revision 1005 seems to disable UDMA at on the HDD, not the CDR/DVD though – what's up with that?

Anthony Dumbrell

O There apparently were, past tense, some issues with P4S333 boards and UDMA, but according to Asus' BIOS file info the problem was solved with BIOS version 1.005. You can still get BIOS version 1.004 from the ASUS support site at:

http://download.asus.com.tw/mb_dl_menu.asp, so it could be worth fiddling with.

There are some other possibilities to consider, though.

If you don't get any UDMA mode reported on startup – if you're seeing some Programmed I/O (PIO) mode reported next to the drive's name on the boot display – then you'll be running the drive at half UDMA/33 speed at best, with considerably more CPU load, and something is amiss.

If you only get 'UDMA 2' reported, then that's UDMA/33. Modern hard drives that support UDMA/66 or 100 or 133 will run in UDMA/33 mode if you connect them with a 40 wire cable, or with an 80 wire cable the wrong way around, with the end hard drive connector plugged into the motherboard, and the motherboard connector plugged into the hard drive. The hard drive connectors are the two that are closest together on the cable.

It's also possible to manually lock an IDE channel to one UDMA mode in the BIOS setup, though that's unlikely to be done by default.

All modern IDE controllers have independent timing registers for the two devices that can be plugged into each IDE channel, so if you put drives with different maximum speed modes on the one cable, you won't force the faster device to use the slower one's best transfer mode. Older controllers couldn't do this, but every vaguely recent one can. When the slower device on a modern controller is doing a transfer the faster device will have to wait, but that's as bad as it gets. So some other device on the cable (if there is one) shouldn't hold your drive back.

If the problem you're seeing is that you can't activate DMA mode for the hard drive in Windows, then try reinstalling the motherboard drivers and making sure your Windows install is fully patched and polished.

And yes, adding a separate IDE controller card will deal with problems like this, although you'll need drivers for that as well. Your operating system may well have these built in.



io@atomicmpc.com.au

i Network irritation

I'm networking two PCs with a crossover cable. One PC is an Athlon with WinXP, the other a Celeron with WinME. The Athlon is showing itself and the Celeron, which is good, but I can't access the Celeron; it says: 'the network path could not be found'. The Celeron is showing itself but not showing the Athlon at all. I've had them going before, but since I reformatted both machines, I can't remember how I did it. Is it possible a hub could have made my networking the first time easier?

Shanan Howe

Point 1: This isn't likely to be a hardware problem. A crossover cable is a perfectly OK way of connecting two (and only two) Ethernet devices. Cable problems will usually either cause the network to work more or less properly but very slowly, or prevent it from working at all.

Point 2: There are lots of things that can go wrong with Windows networking, particularly when you've got different Windows flavours trying to talk to each other. Commonly, it Just Works. Sometimes, it Just Doesn't.

My first guess about why this is happening is that you don't have a local DNS server (with just these two machines, you probably don't), and NetBIOS over TCP/IP is disabled. That can make Win95-series machines inaccessible to WinXP boxes.

To check this, go to Control Panel -> Network Connections on the WinXP machine, right click the LAN connection and select Properties from the menu. Select TCP/IP and click the Properties button, click the Advanced button, go to the WINS tab, click the Enable NetBIOS over TCP/IP radio button, and OK your way out.

Now go outside and meditate for a few minutes, because it may take the XP

machine that long to see the WinME one. Or just reboot everything in sight.

If this doesn't help, there are other things you can try.

Update both machines to the latest Windows patch version using Windows Update, and update your network card drivers as well, if you can.

Make sure you haven't accidentally turned on WinXP's firewall security feature in the Properties for the Athlon's LAN connection.

Disable any other firewall software you're running on either machine.

Disable other extra software, such as virus checkers – virus checkers don't usually cause problems like this, but they occasionally can.

Also, if the Celeron can't see the Athlon in Network Neighborhood, that may just be because the Athlon doesn't have any resources shared.

Machines with nothing shared don't show up.

Oh, and you know what's really irritating about this situation? After I emailed all this to Shanan, he replied and informed me that he'd figured it out.

It actually was the bloody cable the whole time.

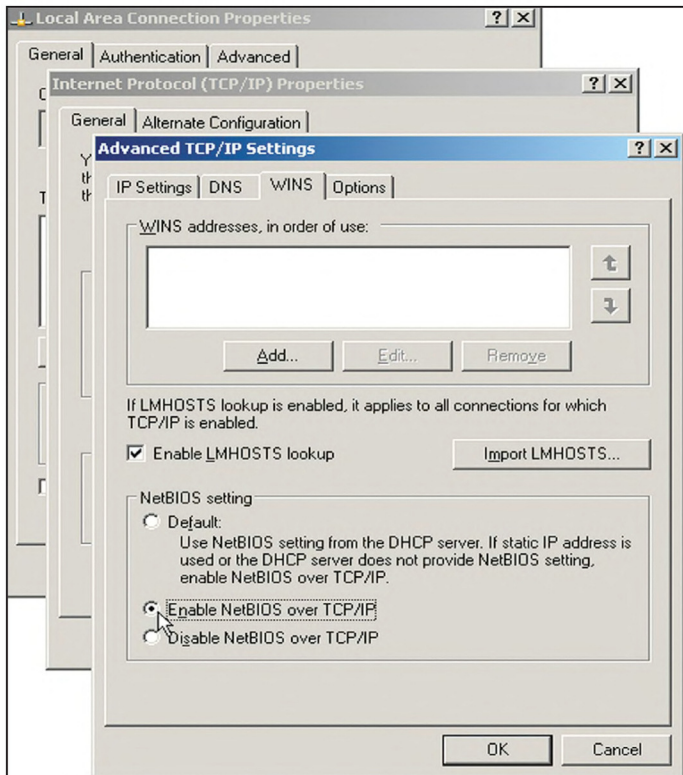
i 16 colour hell

I seem to have a problem updating Detonator drivers for my ASUS AGP-V7100 GeForce2 MX. Every time I update the drivers from the standard Windows XP to anything else I end up only getting 4-bit colour. Can you tell me what's happening?

Mark Quirke

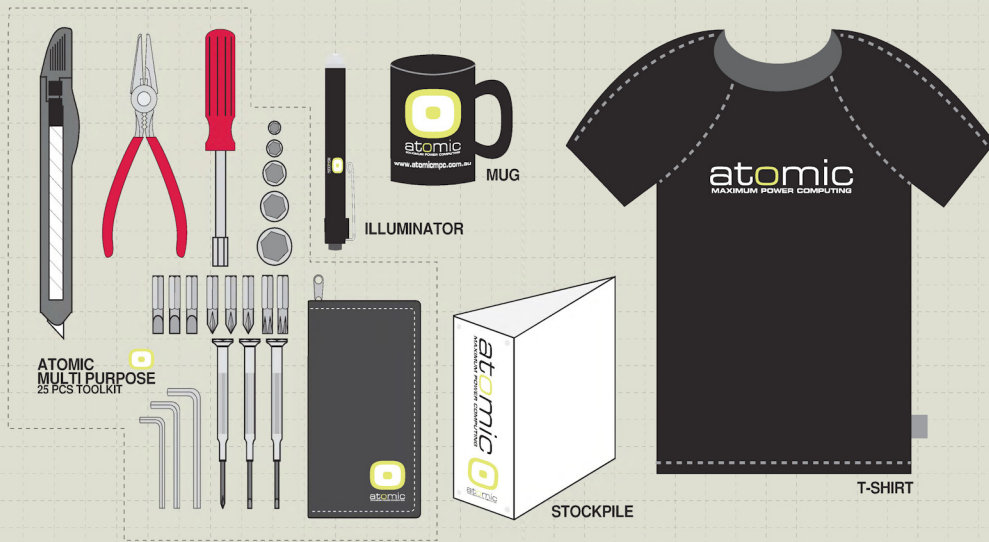
If you're not actually installing the right drivers, that could explain it. There are different driver flavours at www.nvidia.com/view.asp?PAGE=drivers for different Windows flavours; install the wrong one and you're likely to see symptoms like this.

Alternatively, your Windows video drivers may just be hideously messed up. This was (and is) a common enough problem for Win95-series OSes (95, 98 and ME), but it's possible for the NT-series Windows versions as well (NT, 2000, XP). Generally, the solution to this problem is either tedious and painful manual file deleting and registry editing or a Windows reinstall, but WinXP's 'repair an installation' option may fix it for you without requiring the full nuke-from-orbit routine.



ABOVE: Making older boxes visible to WinXP ones, with only 283 clicks!

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The Heavy Water Project: Phase 2 of 4

Enter the shed with Ron Prouse. Do a little or do a lot, or just sit back and enjoy the metal shavings and carbon stains.

Welcome to the second instalment in our series of case-modding articles.

If you read the first article, you will already know that it addressed some of the reasons that modifying computer cases has become so popular, such as creating a more efficient environment for keeping the internal components cooler by adding additional case fans. We also covered the construction of a simple fanbus to supply power to the fans, and running fans at lower voltages to reduce the noise factor.

This article will delve a little bit further into the case-modder's realm, and look at some of the other common mods that enthusiasts like us undertake. As I mentioned in the first article, while some case mods are purely functional, others, such as windows, modified wiring and lighting, are really about personalising the aesthetics of your beloved machine. This is the area where the modifications become much more subjective, and the justification is more about personal taste than increased performance or stability.

As you are probably aware, the pictures that accompany these articles are work in progress on the Lian Li PC-70 I am modifying for *Atomic MPC*. This makes it more difficult than usual to make some of the choices regarding the visual mods, because the final custodian of this case might have elected to go down a different path to the one that I have chosen. Oh well, I'm the one holding the Dremel!

WINDOWS

The fitting of case windows has become so popular that many manufacturers now offer factory-fit items as an option. I guess adding a window is an obvious choice for anyone who has spent mega-bucks on hardware, as it is an opportunity to display where all of the hard-earned dollars were spent – the computer enthusiast's answer to a low-cut top to reveal those expensive implants. Well, in both instances it's all about displaying attractive silicon!

Installing a window also seems to be the gateway into the sphere of harder-core modding: it's the first fix that leads to the addiction.

There are two obvious sub-cultures within the ranks of case-modding: hot-rodders and customisers. Hot-rodding is all about the pursuit of total performance, while customising focuses more on the aesthetics.

Windows are in the realm of the customiser, yet from a customiser's perspective, what is the point of having a window that just shows off a mangled mess of cables? So this leads to tidying-up the wiring with rounded-cables, etc. and next comes the lighting, so that you can see the results of that labour – suddenly, fitting a simple window can turn into a project of great magnitude.

Beware the innocent-looking window: it is the beginning of the addiction, and I guarantee you will learn to love the rush!



▲ I guarantee you will get sick of me talking about planning, but this is where it all starts. The window placement is all about showing off the good stuff, hiding the unattractive, and not interfering with any of your hardware or panel fit. That last one is the main point!

I once put a window in a panel, but then couldn't fit it back on to the computer because the Perspex was pushing against a cross-brace. It was fixable, but time consuming, so be aware of everything that might become an obstruction.

The best way to start is to draw around the inside of your side-cover from inside your case while it is still fitted (you work it out!). Then perform the same exercise with the cover in the almost-off position (slid backward, upwards, whatever it takes) and again mark out the visible section. This will indicate the free space that you have to play with. Make sure you allow for any overlap of the frame contact points around the edges. If you are not sure, go back and check it again, because this is the crucial one-way part of the whole mod!

You feeling lucky?

Want this modded case for yourself? You could win it, by answering our four monthly questions. Send this month's answer in (one per person from the same email address you entered with last month) to win@atomicmpc.com.au, using the subject 'Heavy Water part 2'.

An event important to case modding happened in 1933 at the Rohm & Haas Laboratories, in Darmstadt, Germany. What was it?

Glass versus Perspex

There are several pros and cons to be considered when choosing case window material. In the past, I was an advocate of Perspex or acrylic for several reasons: plastic derivatives are light, easily cut with a jigsaw, can have fans mounted in them and are shatter resistant. The down-side to plastic is that it scratches easily, it doesn't add to the structural rigidity of the side-cover, and it

attracts static electricity – and dust – like no other substance I know!

For my last case mod I used a combination of glass and acrylic, and right from the start I was amazed at the extra clarity the glass had. I have come to appreciate that despite a slight inflexibility in application and extra weight that is inherent with glass, the overall effect is far superior to its plastic cousin. If shatter resistance is a large consideration, then laminated glass is always an option.



▲ As with any hobby that gathers mainstream acceptance, the original, homemade window installations have been quickly overtaken by the emergence of professional, after-market DIY kits, which offer the average handyperson an opportunity to achieve a quality result with less risk of getting it wrong.

How? In addition to detailed instructions, most kits also provide templates to ensure that the cut-out is the right shape and size, rubber edging that allows for some variation in the cutting process while hiding small mistakes, and Perspex that is pre-cut with finished edges. Apart from the possibility of really stuffing up the actual cut in the case cover, or accidentally installing the window on an angle, there really isn't much that you have to worry about. Where can you get a window kit like this? PCCaseGear, a major sponsor of this project, has kits for online purchase at www.pccasegear.com with several choices of size and shape. You can even consider the option of using coloured Perspex rather than the conventional clear finish.

Rather than using rubber edging, I personally prefer the frameless look to a window, mainly as it gives more freedom to the final shape and size. Initially I was going to do a tutorial of both techniques, side-by-side, however as the methodology to both is almost identical, I will simply run through a frameless installation, and you can pick out the relevant sections for your application.

Another option is the frameless installation, but use Perspex instead of glass in the final stage – I have done this when I've wanted the flexibility of putting a fan inside the window area. There is also nothing to stop you from modifying a window kit to better suit the shape of your case. To do this, cut the desired shape out of cardboard, make sure that there is enough edging, and then cut the Perspex to the desired shape before you get started.



▲ When you have mapped out the area to be cut for the window, there is one more factor to consider with the frameless style: there needs to be a 20-30mm overlap for fixing the Perspex or glass to the cover.

This overlap is required for the glue or tape to bond to both surfaces, so mark a line inside the established free area to allow for it. If you are fitting a pre-fabricated window the required allowance is 15mm.

You will notice I have protected any area of the cover that will remain intact with masking tape – on both sides – and I suggest you do this also. As mentioned previously, masking up the case will protect the finish from many of the scratches that are inevitable when you are cutting with power-tools, and it has the added advantage of being easier to mark all of your measurements onto. This window is going to be an inverted L-shape, so as to avoid the fan in the front-lower area, mainly because the window will be fitted with 4mm thick glass.

If the window was going to be Perspex then I would have fitted the fan into the window itself, using the same method as I used to cut the fan-holes into metal in the first article.

If you wondered why there is a can of metal polish in the first picture, it will now become clear. I have used the can as a template for the radius of the corners, to make sure that all of the curves are consistent. Rounded corners not only look better, they are easier to get right than perfect right angles!

For small or detailed cutting a Dremel gives excellent control, but I would recommend a jigsaw or similar when it comes to multiple long cuts that need to be as straight as possible.

A jigsaw needs a hole as a starting point, and I have found that drilling one 20mm hole in each corner of the proposed shape reduces the main cutting to a series of four straight cuts before tackling the corner separately.



▲ Neat trick number 101: support your cover while you are cutting it!

When case manufacturers calculate the minimum thickness/suitable strength equation for their side-covers, one variable they probably overlook is that some deranged person might cut all of the strength out of the centre, leaving just the skeletal structure. If you are not careful, it is easy to twist the residual frame, and if you glue it together twisted then you will have real panel-fit issues later. The answer is to support the sheet metal as close as possible to both sides of the area being cut.

The column that I am cutting on is a section of 300mm diameter, 6mm thick PVC water pipe – to acquire some at the right price, my advice is to get friendly with some construction workers!

When cutting into a case it is essential that adequate support be given to the sheet metal, especially large expanses such as full-tower side covers made of Aluminium. By using something hollow, the metal is supported at 150mm each side of the cut, and the whole cover is stable. This stops everything from vibrating, which results in the cut being much smoother, reducing the amount of filing and sanding required to get that perfect finish. It also reduces the chance of deviating too far from the guidelines.

There are two important factors that help to guarantee a great result. The first one is a cutting blade that is specifically designed for thin sheet metal, with a minimum pitch of 24T (number of teeth per inch of blade length). The second factor is speed, or actually the lack of it! Take it slowly and you will achieve a smoother cut, rather than a jagged rip.

Another tip is to use masking tape over the cuts on each side as you finish. This will hold everything together, help keep some of the rigidity and stop the section that is being removed from flapping around uncontrollably on the third and fourth cuts.

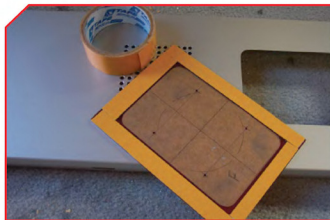


▲ Once the basic shape has been cut out, the next step is to fit the cover back onto the case and make sure the window shape is square to everything and looks balanced. Make any necessary changes now before going through the next part of the process – it will save a lot of pointless filing and sanding.

Use a fine file to remove the worst of the burs around the edges and cut the corners to shape. If you tackle the corners after the main cuts have been made it is easier to maintain a smooth arc, but I would also suggest leaving a millimetre or two of metal that can be carefully removed with a curved file or coarse sandpaper to obtain the final curve. Here's a tip: wrap some sandpaper around the can that was the original template for the curve and sand the edges with that – after all, it should have exactly the same radius as the cut itself.

This next part is the hardest and will take more time than the rest of the project. The long cuts will not be straight: there will be some waves where the jigsaw invariably moved around,

So how do you get them dead straight? There are two methods, depending on whether you have access to power tools. The best option is an orbital sander, as it has a long, flat base that will concentrate on any high-points first. The other option is a sanding block that will also cover several centimetres at a time. An absolute disaster in the making is sanding using just your hand, as your fingers will naturally follow the existing, wavy contour and just accentuate the problem.



▲ I am using glass in the main window panel, so it will be fixed in with two-pack epoxy resin. In the top porthole I am using red-tinted Perspex, so double-sided tape will be fine, mainly because the light weight of plastic means that it doesn't need to be fastened so aggressively.

Any Perspex you buy should come with a protective paper coating attached to both sides, and you should leave it on for the duration! The first step is to place the Perspex into its final fitted position, and then draw around the porthole perimeter. Of course, it doesn't hurt to mark on the Perspex which side is the front! Using a sharp blade, cut through the protective paper exactly on the line and peel off the paper, leaving the area that is going to be visible still covered. The exposed plastic is obviously where the tape is going to be fixed, but there is a bit of preparation needed first. As Perspex is so smooth, the fixing tape would have a battle to get maximum grip, so the trick is to roughen it up slightly with some medium grade sandpaper. Once that has been done, make sure that the Perspex and the case are clean and dry – wipe it over with acetone or methylated spirits if you have some – and cut out the lengths of double-sided tape. Fit the tape to the Perspex just outside of the covered area, making sure not to overlap the tape on the corners – it needs to be a single thickness all over. Peel back the plastic backing on the tape, and push the Perspex up in to position, using the pencil line as a guide to get the position right. Remove the protective paper from the Perspex and be amazed!



▲ I said before that I would use two-pack epoxy to affix the glass to the main window, but after some discussion with my local glazier I was convinced into trying silicon instead. Considering that this would be easier to remove if the glass ever shattered, it made sense. Perspex is easy to cut with a jigsaw, so it is a simple matter to buy a sheet and cut it to size at home, but with glass I suggest that you get a piece of cardboard cut to the exact size and shape that you need, and leave this template for the cutter. The next step is to clean the glass and the cover where they are going to be joined. Place the cover face down on several supports, and put the glass into position. . . it should sit totally flat all of the way around the edges. Take the glass off again, and apply a thin bead of silicon all of the way around the case contact area in the centre of the overlap. Once you have put the glass into position, it will squeeze out to the edges as you carefully press down right around the join. Leave the window for 24 hours in a safe place with a 'phone book or two sitting on top to hold everything in position, so that it cures properly. Once cured, it is easy to remove any excess silicon from the glass with a razor blade and window cleaning solution, and any excess that is on the case will usually come off with a soft pencil eraser. If the eraser doesn't get all of the silicon off the case, use window cleaner or acetone. All done: clean the glass, fit the cover back on the case and admire the view! What? It's too dark to see in? Ah, the answer is light, and plenty of light is coming! Next issue!



◀ Regardless of which method you use, the first step is to ascertain where the waves are and how much metal needs to be removed. Use a steel ruler, or straight edge, to rule a line as close to the cut as possible to highlight the peaks and troughs, and once you know where straight is, it's just a matter of sanding down to that point. If there are any really obvious problem points use a file to remove the worst of the mess, then start off with 240 grit Wet'n'Dry paper and progress through 600, 800 and

finally 1000 grit. Deep or obvious scratches will take forever to get out with fine sandpaper, so never be in too much of a rush to progress to the next finer grade. When you get to the last two grades, use a metal polish such as Brasso to lubricate the sandpaper and you should achieve a mirror-like finish. The final process is to smooth out the transitions of the straight cuts into the curved corners, which is best done with the naked eye, because you will soon see when it looks right!

WIRING

One of the biggest all round improvements you can make to your computer is to tidy up the wiring. It's amazing how making prudent use of just a few cable ties and the careful routing of wires can make a huge

difference not only to the look, but also to the case airflow.

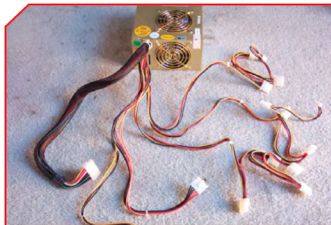
It is also a lot easier to troubleshoot faulty hardware connections if you know where the wiring is supposed to go.

Ever spent hours installing new/old soundcard drivers, to eventually find that the fault was a CD-ROM cable hanging in mid air?

There are three main types of wiring competing for precious space inside your computer:

- Power Critical, PSU to components such as mobo, drives, pumps, etc;
- Communication Interconnects, such as IDE and sound cabling; and
- Auxiliary, such as fans, FanBus, BayBus and lighting.

PSU



▲ Power supplies are obviously a critical component in any computer, and yet the choice of power supply is usually one of those off-the-cuff decisions that you make when the existing unit has become a paperweight. The power supply for this project was kindly supplied by AusPC Market, www.auspcmarket.com.au, and is one of its new Super Flower range: it's the SF-550TS, a 550 watt unit with three fans and gold finish. You can't miss it – it's featured on the index page.

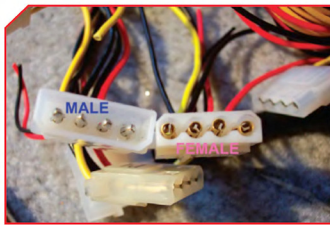
"What makes a good power supply?", you ask. The main things I consider necessary attributes are:

- Enough output to comfortably service your present requirements, plus 20% extra for expansion later on;
- Molex connectors, the more the better (and a P4 block if you have an Intel CPU), on at least three separate looms or cable runs; and
- Additional exhaust fans, because every little bit helps, especially if one of those fans is directly above the CPU area!

Desirable features also include switchable fans, extra 240V outputs and an on/off switch.

One of the annoying things when building a showcase PC is that all power supplies allow the same distance between the Molex / floppy connectors, that is to say, not quite enough, or far too much. What is the answer? Make up your own specific loom suitable to your needs. This may sound hard, but with a little thought, a soldering iron, heat-shrink tubing and a few feet of wire it is as easy as... well, something that is really easy :)

So let's look at a couple of different methods of doing it!



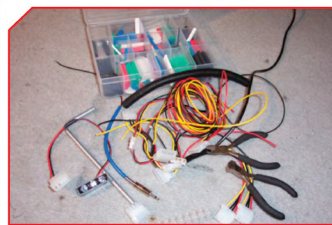
▲ The first step is an introduction to connector sex. There are two types of Molex connector: male and female. The male connectors have the outie bits, the females have the innie bits. If you are still confused, they have been labelled in the picture. Your PSU is fitted with female connectors, and your peripherals are all fitted with male connectors. Yes, the females have all of the power. So, to connect your loom, you will need one male connector to plug into the PSU header, and the rest will all need to be female plugs.

That established, it's time for... more planning! The first step is to ascertain what peripherals are going where: as well as the obvious disc drives (CD, DVD ,etc.) and harddrives, this includes BayBuses, switches, HSFs, lighting and everything else that needs power.

Rather than making one loom do a complete lap of the case, try to arrange things into groups in specific areas, and make one loom for each group.

This next suggestion might seem overly simplistic, but using pieces of string is one way of getting the wire lengths right, as long as you know which piece of string refers to which section. If you use this method... attach labels!

Also consider that there are some things that will only ever require a 12V supply, such as lighting, so running just the two 12V wires for that loom, rather than all four, will help to keep things neater. While going through this process, try and look for ways of running the wires so that they are hidden from view behind structural supports, drive racks and other similar things.



▲ This is everything you will need for constructing your own loom, apart from a soldering iron.

If you have the option, one possibility is to race over to Jaycar, or similar, and purchase a heap of brand new connectors with shiny new crimp fittings, but if you believe that using what you have (and being a good recycler) is better for the hip pocket, then a few feet of colour-coded wire connected to the existing Molex plugs is just as good. And that is a pertinent point – stick with the existing colour coding and avoid confusion later on!

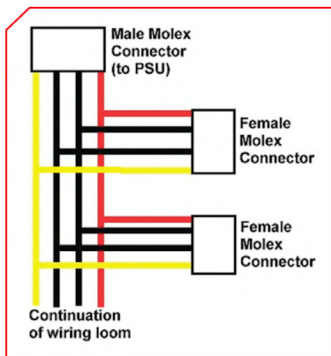
I am going to assume that anyone going this far has the basic tinning and soldering skills required and knows how to use heat-shrink. If not, contact me (rikk) in the forums and I'll share some info.

Using the measurements you have calculated, cut appropriate lengths of wire for each section of the loom, slide heatsink for each joint over one side of the wire (out of the way at present), then tin and solder the two ends together.

Repeat for each wire of each section. After fitting the heat-shrink you can now use electrical tape, wire wrap or split-loom to tidy up each section of wire.

Following this procedure will construct a looping loom, the same as comes with a PSU, except that the distances between the connectors will be the correct length for your needs, and the wires are all wrapped together neatly.



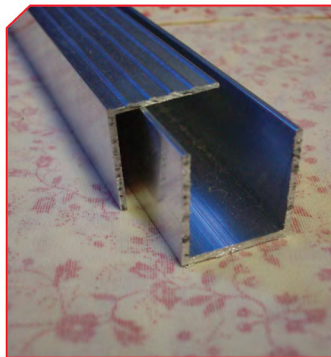


▲ There is another – and IMHO, a better – option, however it is also a little more time consuming. The easiest way to describe it is as a main road with a series of T-junctions. (I guess the diagram is self-explanatory.)

The first thing you need to do is get some wire that is the same gauge as the standard PSU leads, cut it to the maximum length that the loom needs to cover in a straight line down the case, and attach a male Molex plug to the top. This is the main road. Then measure how long each side road has to be, so that the female Molex plugs reach to the point that you are going to power, plus a little extra (15 - 20mm). Splice (cut away the insulation) each of the wires on the main loom run, and solder on the corresponding branching wire at the T-junction. Slide a small piece of heat-shrink up the length of each of the main loom wires, and insulate the joints. This method is the one that works best with the afore-mentioned PowerPole.

I can hear you yelling 'What the hell is a bloody PowerPole, you tosser?'

OK, I will now show you what I am talking about. . .



▲ Last week I was at a fashionable Government welfare institution, waiting to be served by the cheerful soul behind the counter. In the hour that I spent queued, I kept looking at the workstations, with the beginnings of an idea in my mind.

You have all seen workstations that are cabled through a square Aluminium pole up into the roof space, right? Well, why not do the same thing to a computer?

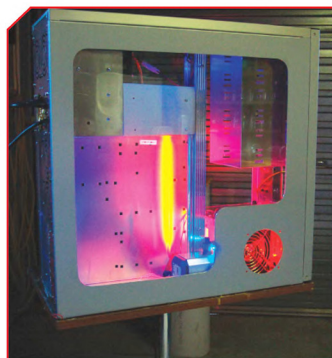
The main requirements are two pieces of Aluminium stock: one being a square U shape, the other an L. As the picture above shows, when you combine these two shapes you end up with a square tube, with an overlapping side where the two can be screwed together. This means that you have a tube with a removable cover plate, so it is easy to route wires and cables through it. You like?

A suggestion is to drill the outer-cover hole with a 4mm drill, and the inner cover hole small enough to run a 3mm thread-tap through. The screw will pass easily through the outer plate, and screw into the inner plate. If you are removing the cover regularly, a 'tapped' thread will be much more durable. . . plus you can use any standard 3mm computer screw.



▲ The next step is to make up a small L-shaped bracket and rivet it to the bottom of the case so there is something to attach the U-section to, and then rivet it to a cross-bar at the top – I had to install the cross-bar, but that was not hard to do. I positioned the U-section so that the open side faced the front of the case, for two reasons. Firstly, any wiring that comes out of the PowerPole will exit via the blind side so that it isn't too obvious, and secondly, so that the cover-plate is easily removed through the left-hand (normal!) side-cover. To run any wiring out, all you have to do is cut a slot in the back side of the U-section, fit a grommet over the wires and slide it all into place.

Once the cover-plate L-section was cut and screwed into position on the U-section, I had constructed my first PC PowerPole. You might notice in the picture that I actually cut the L-section into two pieces, one being about 50mm from the case floor that remains fixed. This is because the Eheim pump is mounted hard up against the PowerPole, and doing this made it possible to remove the cover with the pump still in place.



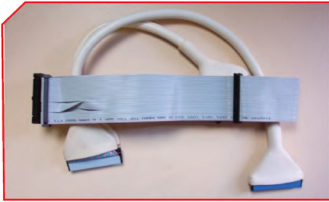
◀ While I was at Bunnings picking up the Aluminium, I spotted another length of Aluminium that had a profile with potential: sort of an open P shape. It looked like it would be the perfect size to conceal 240V power-cable. . . and I had a pump cable to hide. Not only was it the perfect size, it would also fit a rounded IDE cable with a bit of a squeeze. Save that thought for later. . .

An hour later, the pump cable was hidden from view, and I realised there was another up side to all of this: I now had another mounting point for a privacy screen, the sheet-metal cover that is now between the PowerPole

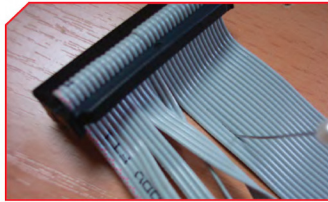
and the PSU mounting bracket. This screen will conceal all of the wires where they exit the power supply, and provide a home for the relay that controls the pump switching, but still allow airflow out through the top-fan and the relocated harddrive rack.

To achieve this all I had to do was take a piece of the aluminium that was left over from cutting the hole in the side-cover for the window, then cut it to the dimensions of the 'gap' and allow a little extra at each end for a 'tongue' that would attach with 1/8" rivets to the PowerPole and the PSU mounting bracket.

Interconnects



▲ When your computer was originally constructed, without a window, there was only one consideration in mind: functionality. The case was a closed box, so who cared if wires ran all over the place, as long as the main components could be accessed and plugged in easily. Slamming the side cover back on would hide all of the enclosed sins. Now that you have a window that allows you to see into the bowels of your case, you have probably noticed for the first time that it really isn't all that pretty. In fact, if you are the sort of person who has changed and added hardware a few times over the last couple of years, it probably looks downright disgusting! Time to tidy and remove some of the built-up fluff and dust while you are at it. I will concentrate on the IDE cables, as audio wiring is addressed using the same methods outlined in the power wiring section.



▲ Home made will always look home made, but that aside, the process is very simple, and this is all you need:

- A pin;
- Electrical tape;
- Convoluted split-loom (Jaycar, or most auto accessory shops); and
- Scissors, or a utility knife.

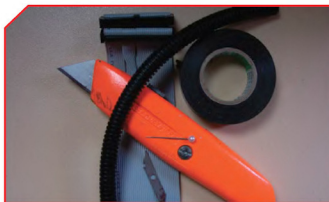
I learned the 'pin-trick' after destroying a couple of cables by trying to cut the full length with a razor blade. . . one slight slip, and the closest wire core was an open circuit! That's when it dawned on me that if there was just a small initial nick in the cable, the insulation would easily split along its thinnest point, which is between the wires. So, by starting with a small incision made with the pin, carefully pull the wires apart. The more strands you separate the better the finished look will be, but three wires per strand works fine.



▲ Once you have separated the strands, start by wrapping the connector ends with the electrical tape using the scissors or utility knife to neatly cut the ends of the tape, and if you cut it properly you will find it won't start to unravel in a month's time.

Wrap the remaining length of the cable with the electrical tape, keeping the profile as round and smooth as you can. When you get to the other end, try wrapping some tape back towards the middle, as an additional safeguard against it unravelling over time.

Take some of the split-loom and cut it to length, and then place it over the cable. Once it is on, twist it a little over its entire length, so that the split isn't in a straight line – this will stop the wires pushing their way out on any curves – and tape the connector ends of the loom tightly, overlapping onto the area that has already been taped.



▲ Some of the big air traps that should be addressed are the standard ribbon IDE cables, which tend to act like sails, interrupting and diverting the flow of air around them. Rounded cables are a good investment if you are seriously customising your case, because not only do they aid airflow, but they also make the wiring look much neater, and come in

a huge array of colours. 18 months ago rounded cables were almost impossible to find in Australia, but now even Jaycar stocks them, such has been the demand – and, accordingly, the price has now fallen dramatically.

But, what if you object paying three or four times the cost of a standard ribbon cable? Well, why not make your own? ○

SUPPLIERS:

The backbone of a project like Heavy Water is the few special companies who supplied the components. The beauty of working with these

people is that they are genuinely interested in pushing the boundaries of our case modding obsession. The companies listed below have been suppliers to this project to date, and deserve your patronage. As the list grows we

will add the companies to it.

Special thanks to James Cameron of PC Case Gear, he is one of those permanently helpful and positive people who will do his utmost to help anyone that needs assistance.

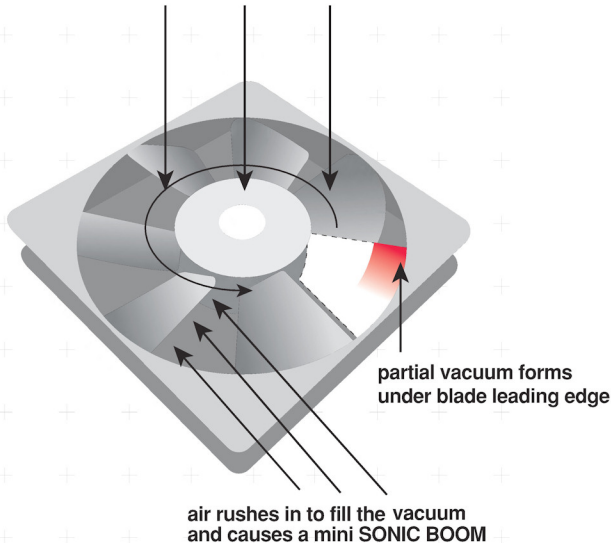
Supplier	Provided	Contact details
Anyware Computer Accessories	Lian Li PC-70 USB case, Macpower Digidoc 5	P: (02) 9879 5788 www.anyware.com.au
AusPC Market Pty Ltd	Super Flower 550W PSU	P: (02) 9817 2899 www.auspcmarket.com.au
Silverprop	SilverStorm Radiator	P: (03) 9820 0908 www.silverprop.com
PC Case Gear	Cold cathodes, LaserLEDs, Laser cut grills, Enermax fans, Window etch, Molex Splitters	P: (03) 9572 3444 www.pccasegear.com

Noise elimination

Craig Proctor shows you how to get your PC to STFU. . .

CAVITATION⁰²ATOMIC

AIRFLOW (sucking air into fan)



Do you have an eight fan, quad hard drive, 3D accelerated, Dolby pumping overclocked beast of a box?

As proud of it as you are, I'm guessing two things:

- a)** It's about as noisy as a V8; and
- b)** You (or family members) have wished it were a little quieter.

Even without overclocking most computers are just plain noisy. The main components in any computer that produce noise are the hard drive(s), the cooling fans for the PSU (Power Supply Unit), the CPU and the video card, and it's not like we can remove them, because currently they're all fairly essential. So what can we do to quieten the beast?

For starters, pull your computer further away from the wall/desk that it's pushed right up against. Not only will the air expelled from the PSU fan and rear cooling fan (if you have one) be able to better circulate around

the case (possibly helping cooling) it won't rebound off the wall or desk and contributing more noise. While this is likely to only make a small difference, and one that's hardly noticeable, it's still something you can try for nothing.

Full metal jacket

Most PC cases are made from pressed sheet metal panels, which, if thin and flimsy, may warp or distort and act like a speaker cone to amplify any internal noise. When initially choosing a PC case check to see if the sides have any 'give', and if this is the case (!) then maybe consider another make and model that is a little more solid.

If you already have a flimsy case, which you don't want to part with, then try reinforcing or soundproofing the side panels: you'll need something straight that won't bend easily – such as pieces of wood,

metal, rulers or whatever – fastened in an 'X' shape and then screwed or glued onto the inside (or outside) of the panel. These reinforcements will give the case extra support and strength, and the added weight will help dampen any amplification of internal sounds.

Soundproofing your side panels is less traumatic, but more expensive. Commercial soundproofing mats are basically just large squares with adhesive on one side and carpet or some other sound absorbing material on the other. The difficult part can be fitting the mat correctly inside your panel – these things are *extremely* sticky, so take your time fitting them or you'll make one helluva mess foo'!

Drive

Hard Disk Drive (HDD) noise is generally produced by vibration due to unevenly balanced platters or irritatingly noisy stepper motors moving the read / write heads during data transfers.

You can reduce vibration noise by using a 'shock absorber' between the HDD and the case, such as some rubberised weather seal tape. This is mainly used around the edge of doorframes to stop draughts, and should be available from most hardware stores. Just a few short strips of this tape on the sides and bottom – or top, depending on which way you mount the HDD – should do the job. If you want to go the whole hog, you could also use rubber grommets between the screws, case drive bay and the HDD.

Unless you have a bank of older 5400RPM drives, or your existing drives are exceptionally noisy, you shouldn't really have to go to the trouble of fitting your HDDs with 'shock absorbers'. Most newer 7200RPM HDDs are fairly quiet, so generally it's just your system fans making all the noise.

The fan

Fans create noise due to a combination of turbulence, cavitation,

'The main components in any computer that produce noise are the hard drive(s), the cooling fans for the PSU (Power Supply Unit), the CPU and the video card, and it's not like we can remove them. . .'

bearing noise and vibration:

Turbulent noise is created by a fast moving stream of air through a small opening, such as wind whistling through a crack in a wall (where's that weather seal tape?), someone playing a flute, or yesterday's burritos you had for lunch.

Cavitation noise is the result of air or liquid rapidly moving past an object and causing the formation of a partial vacuum behind that object. An audible shockwave is caused when air or liquid rushes to fill that partial vacuum. Watch *Das Boot*, *U-571*, *The Abyss* or just about any movie set underwater and you'll hear the propeller cavitation noise.

Bearing noise is caused by friction between the ball bearings, the lubricant and the channel in the material that the bearings roll in. Unless your fan is in really bad shape or old (in which case, give it a spot of sewing machine oil), bearing noise should be almost non-existent.

Vibration is usually due to improperly balanced fan blades or problems with the bearings, so you should probably get a new fan anyway if you're having this problem.

The fast and the furious

Here is the key element to noisy fans: the faster the fan, the noisier it is.

Most high performance CPU cooling fans spin at 4000RPM (revolutions per minute) or higher, move 20-cfm (cubic feet per minute) of air and create a noise that is 30 or more decibels in intensity. So how do we get them to shut up?

a) Mod that case baby! Turbulent fan noise can be reduced by removing the pressed metal fan guards in your case and replacing them with wire fan guards. This may also help with cooling, as you won't have the pressed metal fan guard obstructing the incoming or out going airflow.

b) Install a larger fan: larger fans have a bigger blade area than smaller fans (obviously) and can theoretically move the same amount of air at a slower speed. There are

various 80mm to 60mm adaptors available to stick larger fans on your CPU's heatsink.

c) Water-cooling, while not totally silent, is generally quieter than a fan; however it can be difficult to water cool anything other than the CPU.

d) Slow your fan down: a slower fan runs quieter, but also moves around less air.

Heat

'Hang on. If I slow down my fan to make it quiet, it moves less air – won't that cause my CPU to overheat?' I hear you ask.

The simple answer is 'maybe'. At worst there should only be an increase of a few degrees, but that may be enough to cause an over-clocked system to become unstable. Unfortunately the only real way to check is to slow your fan and see how your system responds.

Remember: any modification you do to your system is at your OWN RISK. Should you attempt any modifications and overheat your system until you can cook eggs on it, *Atomic* and the author take no responsibility for any damage you may do! (Though I do prefer mine sunny side up, and they will be easier to cook on a desktop rather than a tower system.)

Speed

The easiest way to control fan speed is to adjust the voltage to the fan, so to slow the fan down we obviously need to reduce the voltage. (See *Atomic* issue #16, part 1 of the Heavy water project for detailed information on constructing a Fanbus or bay bus).

If you don't own a soldering iron, or you simply don't want to mess around your computer, you can buy a commercial fan voltage adaptor for around \$15. But these only let you control the voltage to one fan at a time and may not be suitable for all fans. Commercial fanbus controllers are also available and cost between \$50 to \$80.

A new hope

We are getting closer in the evolution of computers to silent and speedy PCs. Even Microsoft's PC design checklist

(www.microsoft.com/hwdev/platform/pcdesign/sign/checklist.asp) for companies producing Windows machines suggests: 'The PC should be as quiet as possible so that it is welcome in the kitchen, bedroom, and living room, based on the following guidelines: the target for the declared sound power level of the PC should be 37 dBA in the sleep state and idle mode, but no more than 50 dBA. The target level should be less than 55 dBA in active modes.'

Each generation of CPU has more processing power and generally uses less electricity (and therefore produces less heat) than the previous generation as manufacturing methods of smaller and smaller electronic components are devised.

The Intel Pentium 4 is faster and uses less power than the Pentium 3, and the AMD Thoroughbred is likewise better than the Palomino and Thunderbird series of CPUs thanks to its current leading edge technology. Some recent CPUs (like the C3) require no cooling fan at all.

It's not over-speculation to suggest that advances in the manufacture of smaller and smaller components smaller will soon result in multi Gigahertz CPUs, video and memory chips that require no active cooling. Hard drives are likely to be replaced by affordable, large capacity flash RAM (memory sticks with storage capacity of Gigabytes), so the computer of the near future will operate in silence and will also be extremely shock and vibration resilient (example: MP3 player versus a CD player).

Even better, your silent computer will consume less electricity and you'll be helping to save the planet by producing fewer Greenhouse gases. I think I need to go hug a tree now.

Free bees

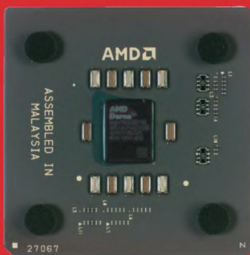
Duron 1.3

Are you still sub-GHz? Do your friends have any respect left for you? Do you even have any friends?

If you're running a Socket A board with anything less than 1,300 megahertz of bumping, thumping, munting go-power, then this is the competition for you! Oh boy! Pull your old one out and stick this in, then watch bedazzled as gaming hits lightspeed. Kaboomie. NOW you're living, huh? Yeah baby. Win this and you'll be all set to play Dragon's Lair 3D with most detail on! Good? No. Great, at the very least!

Thanks AMD, for being a generous sport.

Q: What was the name of the special combat variant of Space 1999's Eagle?



mStation Car Jukebox

MP3 is just about the most wonderful thing that's happened to music since the breakup of Racey. Chair dancing in front of your PC is nice, living room MP3 boxes are like a real stereo but with enhanced swirly patterns on the TV and Walkman MP3 makes bus travel almost tolerable – but imagine in-car MP3! Yep, fully. With a 40GB HDD, the mStation lets you store around 12,000 MP3s, which, at an average road speed of 60kph and no refueling stops, means that you could drive for a whole month without hearing the same song twice.

This data has been verified by Atomic testing, using the official staff vehicle: the 'Atomic Bomb'. Superkind thanks to

www.kazelectronics.com.au
(02) 6260 2666. It's worth almost a grand!

Q: In House music history, what was the first ever Acid track called?



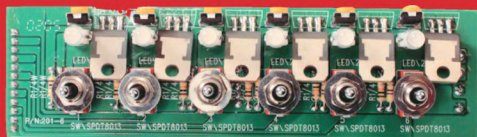
Baybus kit

Fans are bullshit. In the future we'll surely have some kind of ion-driven magneto sub-particle no-moving-parts method of shifting large volumes of air. And then everything will be nice and quiet. Apart from the sound of our holographic sound-projected Quake XIV double shotgun. Impeller blades are sooo Archimedes.

As a stop-gap solution, there's the fanbus, which lets you throttle fan speeds to meet your needs. We're giving one away, thanks to

www.pccasegear.com (03) 9572 3444. Some of you may even want to overclock your fans. We know there are people like you out there.

Q: What's the main effect that allows flight?



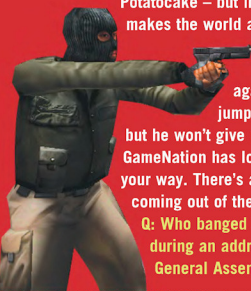
Tactical Ops

The full title is actually Tactical Ops: Assault on Terror. Makes you think, eh? With a game like this, we gamers can do our bit in the War On Terrorism. Every little bit helps. It may not be an Osama that you snipe from your urban rooftop – more likely it'll just be another

Potatocake – but in its own small way, that too makes the world a slightly better place, if only until the PotatoEvil respawns and you have to track him down again, in the usual spot, trying to jump up on the barrel that's too high, but he won't give up trying to reach.

GameNation has lobbied 6 copies our way to lob your way. There's a fire in our hole and we're coming out of the wall, man.

Q: Who banged his shoe loudly on the podium during an address to the entire United Nations General Assembly?



Atomic 16 winners: Jedi Knight II: Outcast: Q. What is the purpose of mitochondria? A. The purpose of mitochondria is to get energy from adenosine triphosphate, a high energy phosphate bond. M. Szwecuk, Blacktown NSW; L. Stillard, South Melbourne VIC; T. Steele, Gympie QLD. A7N266-C: Q. In French, is a computer un or une? A. In French a computer is 'un' i.e. 'un ordinateur'. L. Horn, Mt Macedon VIC. Athlon XP 1700+: Q. What is the name of the ancient procedure that involved drilling of holes in the skull for enhanced head goodness? A. Trepanning/Trepanation was used for 'curing' various ailments such as headaches and mental illness, to encourage enlightenment, and to release evil spirits, among other things. J. Harrison, email. Web hosting: Q. How did canned spiced ham become a term used to describe wasteful and annoying email or messages over a network? A. It all started with an old Monty Python skit in which a group of Vikings sing a chorus of 'SPAM, SPAM, SPAM...' at increasing volumes in an attempt to drown out other conversation. The analogy to modern-day spam applied, because unsolicited email is seen as drowning out normal discourse on the Internet. A. Cross, Bunbury WA; S. Fraser, Caulfield VIC; C. Tai, Hurstville NSW; C. Stockwell, Yungaburra QLD; A. Webb, Springwood QLD; P. James, email.

Email entries to win@atomicmpc.com.au or post them to: Atomic, [Competition Name], PO Box 275, Beaconsfield NSW 2014. Please send a separate entry for each competition. The closing date for entries is 19 June 2002. Winners will be announced in Atomic 19.

Terms and Conditions of Entry. 1. The promoter is AJB Publishing Pty Ltd (ACN 083 063 914) of Unit 2-5/44-70 Rosehill Street, Redfern NSW 2016. Promotion period is from 9.00am on 19.06.02 until 12.00pm on 18.07.02. 2. Entry is open to residents of Australia and New Zealand. Management and employees of AJB Publishing Pty Ltd and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. 3. Enter by posting or emailing forms to AJB Publishing Pty Ltd. 4. The draw will be held at the offices of AJB Publishing Pty Ltd at 5.00pm on 18.07.02. Winners will be notified by mail and published in Atomic 20. The prizes are not transferable or exchangeable. 6. The judges' decision is final and no correspondence will be entered into. 7. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. 8. All entries will become the property of AJB Publishing Pty Ltd.

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ON SALE NOW

Letters entertain you

post@atomicmpc.com.au is where you can send miracles of free expression, which, if they glow in the dark amongst the others, will be reprinted and probably edited for brevity and clarity upon these very pages. If your sparkler is of outstanding specialness, we will send you a reward in the form of some funky kit. For this installment of LOTM and POTM, the booty is a relatively spectacular Gainward GeForce4 Ti4200 CRT, worth around \$320.

Grateful thanks to www.pcrange.biz for this El Grande prize.



POTM: C++ Please help

www.atomicmpc.com.au/forum.asp?cat=pr&top=49395 (full post much too long to reprint here)
The omniscient stadt answered a C++ format conversion problem posted by Solid_Snake. Not only did stadt provide a solution to Solid_Snake's problem, stepping through the relevant code and explaining how each section

solved a specific problem, he was also kind enough to do the same thing again in C++ when someone noticed he'd done his original calculations in C. Then, in an effort way beyond the call, stadt recoded the solution after Solid_Snake remembered that use of char arrays wasn't allowed in this problem. stadt put a large chunk of both time and effort into helping, and that's what we liked most of all.

LOTM: Super cool cooling

After reading the article titled 'The Heavy Water Project' I began to join the dots laterally, as you sometimes do at 2am. In daylight most of these ideas evaporate, but this one stuck and I would like your thoughts on its feasibility.

I have noticed you devote much column space to cooling matters, and this I do know a little about. Air in general is a poor thermal conductor and you need a lot of it to transfer a relatively small amount of heat away from a solid, in this case an overheated and overclocked silicon wafer and heat sink.

Many years ago I remember seeing one of those bloody awful US tele-ads on late night TV (does anyone actually ever buy that crap?) – I think it was for a car polish or something – anyway, they got a Perspex tank of this stuff which was clear like water and immersed an operating TV into it, and the TV just kept on working. I am also aware that the much-revered Cray UberComputer was liquid cooled, using liquid Freon to cool itself, hence its nickname of 'Bubbles'.

OK, that's the wind up, here's the pitch: if air is such a lousy medium why don't we replace it with a liquid, and I am not talking about a dinky little water jacket over the CPU. It should be a non-conductive, non-combustible (non-carcinogenic), clear and inert chemical or compound that we can totally immerse our mobo, cards, HDD, power and non interactive bits into, and simply use

an external Low Voltage pump to circulate through an external heat exchanger (eg. fridge compressor). The liquid would be all pervasive and far denser than air, natural convection would be sufficient to cool the hot bits: it heats, it rises, to be replaced by cooler liquid from below etc.

You could then remove all fans and construct a sealed and silent Perspex and stainless steel case that would really rock. No overheating, no dust or contamination etc, no clearance or airflow issues, and therefore a smaller box could be a possibility. Put a simple liquid filter downstream of the pump and your chemical cocktail is crystal clear. Put an inert dye in and a couple of cold CRTs and you have colour and light, put an air bleed valve into the pump line and you have bubbles and movement (goldfish not recommended).

If the liquid has a low freezing point think of the possibilities: your system immersed in liquid at minus Celsius with the CPU temp barely able to get above 10°C while doing warp 9.8. External case condensation/freezing may be a problem (case lickers beware) along with the fact that resistance in some materials is lowered along with temp, ie. silicon, but the electrons would only tend to slip off the grid if approaching -70°C, which is not a possibility in this proposal unless you happen to have a vat of liquid nitrogen/argon available to you.

Well watcha think?
Marc Watson

After taking a quick poll around the office, a startling number of us have the unfortunate regret of remembering such advertisements. But what you're most likely thinking of is a 3M product called Fluorinert.

Fluorinert is a chemical produced by 3M (love those guys!), and defined as a Perfluorochemical. To the best of our knowledge, Cray systems used liquid Freon to cool the Fluorinert, rather than apply the liquid Freon to the computer directly. Basically this involved an external heat exchanger, which used Liquid Freon to drop the Fluorinert temperature to 10-20°C. The cooled Fluorinert then passed through the Cray, emerging on the other end at about 40-50°C, where it re-entered the heat exchanger and began the journey anew.

Cooling with mineral oil has been experimented with since the early days of overclocking, and is used in conjunction with a heat exchanger, much like the setup used in the Cray.

However, something like Fluorinert is a much better option. Fluorinert is a great product, odourless and colourless with thermal conductivity slightly better than water, but best of all, it's an insulator. Those are the upsides.

The downsides are that it costs approximately AU\$500 for one litre, and that it does not freeze below zero, rather it turns into something resembling personal lubricant at around -10°C to -20°C. Great for easing, erm, friction burns, but not for cooling.

Tanya's no Renegade

I was reading through *Atomic* 16, and I stumbled across the Command and Conquer: Renegade review. As I was reading through it I couldn't help but notice the comments about Tanya, and why she wasn't featured in the game.

Initially, I agreed with the comments made, because Tanya would have been a very cool character to play as, but then, as I was discussing it with my mate he made a really good point that I think might clear things up:

Tanya = from the Red Alert games
Renegade = not a Red Alert game

The reason Tanya didn't appear is because she comes from the Red Alert games, and C&C: Renegade obviously isn't set in the Red Alert World. So putting her in the game would be like putting Mayonnaise on your chips – same sorta stuff, but it just wouldn't feel right.

I hope you see the logic in what I'm trying to say :) – never fear though, if patterns in the C&C games of the past are anything to go by, we could possibly see a Red Alert: Renegade or something along those lines. Then we might get to watch Tanya run around in tights as she blows up Tesla coils and runs away from mean Soviet doggies. I mean, think of the original C&C: it was followed by Red Alert, then Tiberium Sun was followed up by Red Alert 2. So now that Renegade's out... what next?

Nathan Samu – Kiwi Atomican Padawan :)

The modem messiah

When I moved to my new townhouse in Castle Hills, NSW, my Internet was great, my modem work fine, like 49.333Kb/s or something and it always dialled up, but now that I've moved BACK to my old house, my modem hardly connects. If it does, which is once in like, five times, it works like shit: only at a mere 28Kb/s and it disconnects every five minutes after I connect.

I can't go to any Web pages – not even the home page – it just lags and lags. I was just wondering: because I'm living in my old house, and it's like two houses on one piece of land, is the phone line just frucking crap in my old house or could it be my Conexant 56Kb modem (I don't think it IS the modem, because in the new town house I was renting it worked magic)?

My old house is in Baulkham Hills, NSW – just a few streets away from my new house but in a different suburb. Do you think I should get cable instead of this shit? Or should I get something else?

Mike Hegans

Modems. . . Go broadband, but in lieu of this try tweaking your modem:

- 1) Check all cables and plugs – clean points, use as short a cable as possible;**
- 2) Check your modem settings**
 - set port speed to double the modem speed, so 115,200bps
 - fiddle with error correction and data compression – if the tick boxes don't work, use a custom initialisation string like ATZ (to fully reset to factory default), AT&FX3 (to set to factory default and turn off wait for dial tone) or AT&FX3%COE1 (to set to factory default, turn off wait for dial tone, turn off compression and error correction) – some of these variables might not work on your modem though. . .
- 3) Progressively lower modem speed until it works – you might get away with 33.6Kb/s or so even if not higher.**

Is it 'it's' or is it not?

I need help in settling a long-standing difference of opinion.

When the *Atomic – Good Things You Need* CD starts up you hear a wanna-be Disney cartoon character voice say, 'Is it Atomic?' and in response there is a young child saying – as far as I am concerned – 'Yes Sir! Very Atomic!'

Now the problem is this: my husband is adamant that the child says: 'Yes sir! It's very Atomic!' We have played it over for friends and family, and they all agree that there is no 'it's'. I was wondering if someone at *Atomic* magazine could please confirm the lack of an 'it's', and at the same time confirm that my husband has lost it (as a result of spending many hours gazing mindlessly in front of our computer screen, I am sure!).

Even though you are all self-confessed computer geeks, I am counting on you to solve this! Thanks!
Just another computer widow,
Nicole Strickling.

Anyone who missed out on the CD will find the answer in our downloads section
www.atomicmpc.com.au/files/atomic.wav

We chopped it up, slowed it down and found nothing like an 'it's' in the response from the young child, but when we played it backwards it says: 'Cimota yrev'... which sounds a bit like 'Ya motor rev'. More power or what?!

That heatsinkin' feeling

While fiddling around with the insides of my computer has never been anything new to me, I have always set limits on what I do. For example, I have yet to

overclock my CPU as it is still in warranty and it is running more than fast enough at the moment anyway.

Well, when I bought my computer, I had decided on the WBK-38 as I had heard that it was a good performer, however, I had not heard how loud it was. So after six months of putting up with the noise and over a year of reading your magazine, I got this mad idea to replace the heatsink and fan myself. The first step was getting the old heatsink off, which proved to be quite a challenge that resulted in a lot of swearing and praying that my CPU would survive (the clip broke in the process which made it even harder to get off). I did and I am glad to now report that I have a cool, quiet running system and with another couple of case fans added of course. The moral is that you should always try to extend your boundaries to get better at things every day (and no, that does not mean you should try soldering wires from your CPU to graphics card to try to get a better rate of bandwidth).

Murray Lake

(Not) everyone's a winner!

How would I know if I won something in the competitions @ *Atomic*, and how much earlier will I be notified if I win it? I really wanted to win that case, the Dilithium AL3 (I have high hopes and dreams) and I just felt like the first person to send the mail to win@atomicmpc.com.au and that after whenever I'll have a tankass new case to look at for my system, 'cause I've got all this modding stuff ready but not for the budgo crappy case I've got now.

Thanx 4 anything. . .

PS. If it's possible for you I would do ANNNYYYYTHING! I mean !!anything! I tell ya even. . . even dance naked with my system for you, if you could just somehow make me win. Or I'll do 1000 pushups while holding my computer on my back, or nail anyone in Counter-Strike (me versus 100 people) and I'll get a coupla kills. I MEAN ANYTHING.

PaIO Soldier

Does anyone want to picture a naked PaIO doing 1000 pushups with one hand, fragging 100 punks in CS with the other, all while his PC rides on his back? No. We didn't think so. Nice try fella – keep on sending those entries in, and one day (maybe) you'll be lucky. For the record: all competition submissions are entered into a computer before the winners are randomly selected.



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Have you done your "CASE" study?

We are talking about Aluminium Cases!

You may have the latest and fastest CPU and VGA card. Do you have the best case to house all the greatest components? Aluminium cases dissipate heat 3 times faster than traditional steel cases and when it's made by Lian Li, your PC experience is guaranteed luxurious. Here are some comments:

apc *Australian Personal Computer*

"Lian Li cases are legendary among PC enthusiasts and case-modders, and are generally considered to be the Rolls Royce of aftermarket PC cases. Not only because they are comparatively expensive, but because their features and attention to detail warrant the price."

PC PowerPlay

"A stunner. All aluminium and built to withstand a direct nuclear strike in the megaton range. As we have mentioned more than once, we even dropped this case down a flight of concrete steps and it barely flinched. Ten bays keep everything snug, three extra fans keep it cool, and slide-off covers and a motherboard tray mean it's ready for upgrade action any time."

atomic

"Undoubtedly the parent of the Aluminium case craze, Lian Li has been incredibly successful in changing the case buying mindset."

See detailed reviews

(search "Lian Li") at

www.dansdata.com

www.overclockers.com.au

www.gamingin3d.com

All cases come without power supplies

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PC-60USB
Silver full aluminium anodised
\$390 RRP



PC-65USB
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\$475 RRP



PC-12B
Powder coated external with full aluminium inside
\$320 RRP

Common features

- ◆ Sliding tray for motherboard
- ◆ 2 front ball bearing fans with filter
- ◆ 1 rear ball bearing fan
- ◆ Selectable fan speed control
- ◆ Thumbscrews
- ◆ 490x210x450mm
- ◆ 12 total bay 4x 5.25", 3x3.5", 5x3.5 Hidden

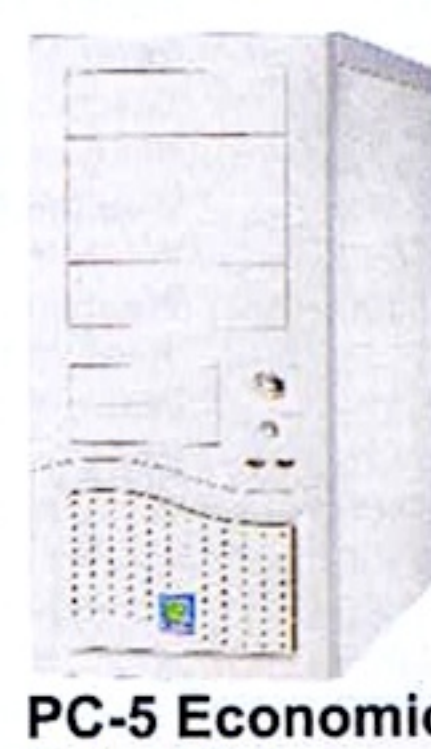


PC-70
Silver full aluminium anodised \$539 RRP



PC-71
Black full aluminium anodised \$559 RRP

- ◆ 2 front ball bearing fans with filter
- ◆ 2 rear ball bearing fans
- ◆ Selectable fan speed control
- ◆ Thumbscrews
- ◆ 210X595X588mm.
- ◆ Suitable for dual CPU M/B.
- ◆ 15 total bay



PC-5 Economic
Beige Colour powder coated
\$199 RRP



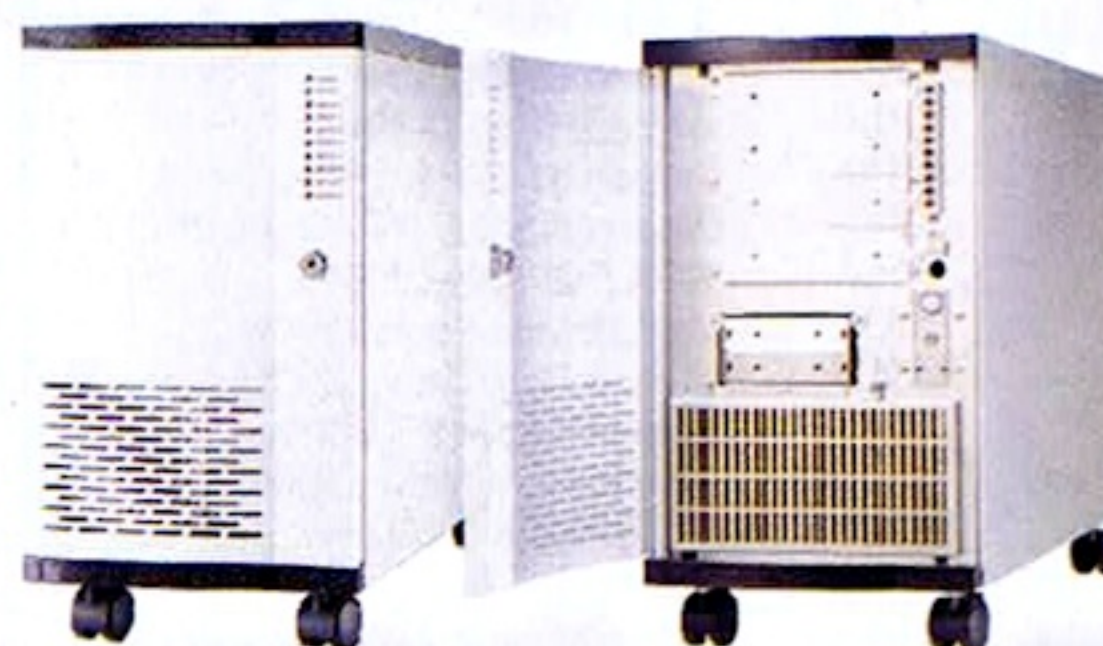
PC-6 Economic
Silver colour powder coated
\$199 RRP

- ◆ 2 front fans with filter
- ◆ 1 rear fan
- ◆ Selectable fan speed control
- ◆ Thumbscrews
- ◆ 490x210x450mm
- ◆ 12 total bay 4x 5.25", 3x3.5", 5x3.5 Hidden

Aluminium Server Cases



PC-72SCA
Silver full aluminium anodised
◆ SCA-2 hot swap bays supports SCSI Ultra160
◆ SCA-2 backplane module
◆ 2x16cm ball bearing fans
◆ Selectable fan speed control
◆ Thumbscrews
◆ 589x209x574mm
◆ 13 total bays
\$790 RRP



PC-626
Silver full aluminium anodised
270x665x498mm
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4x5.25, 3x3.5, 8x3.5 hidden for HDD
◆ 4 x 12cm two ball-bearing fans
Suitable for dual CPU M/B
◆ On SCA version: SCA-2 Hot Swap bays, Support Ultra 160, SCA-2 backplane module
\$1190 RRP, SCA \$1390 RRP

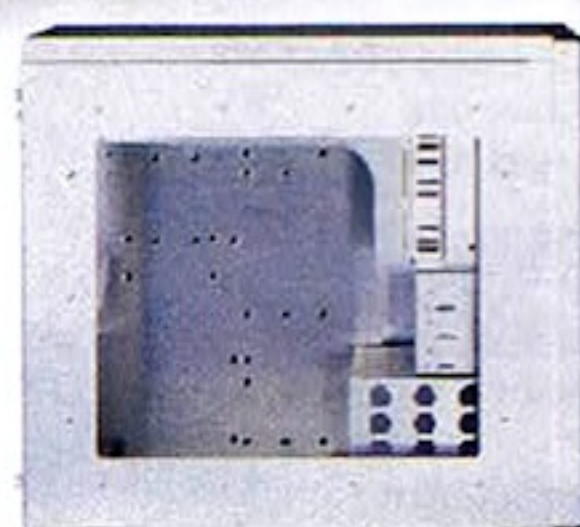


PC-76
Silver full aluminium anodised
◆ 20 total bays 6x5.25, 2x3.5, 12x3.5 hidden
◆ 6 ball-bearing cooling fans
◆ 265x559x630mm
◆ Suitable for dual CPU M/B
\$990 RRP



PC-78
Silver full aluminium anodised
◆ 20 total device bays
6x5.25, 2x3.5, 12x3.5 hidden for HDD
◆ 4 x 8cm two ball-bearing fans
2 x 12cm two ball-bearing fans
◆ Suitable for dual CPU M/B
(Max size: 12 x13)
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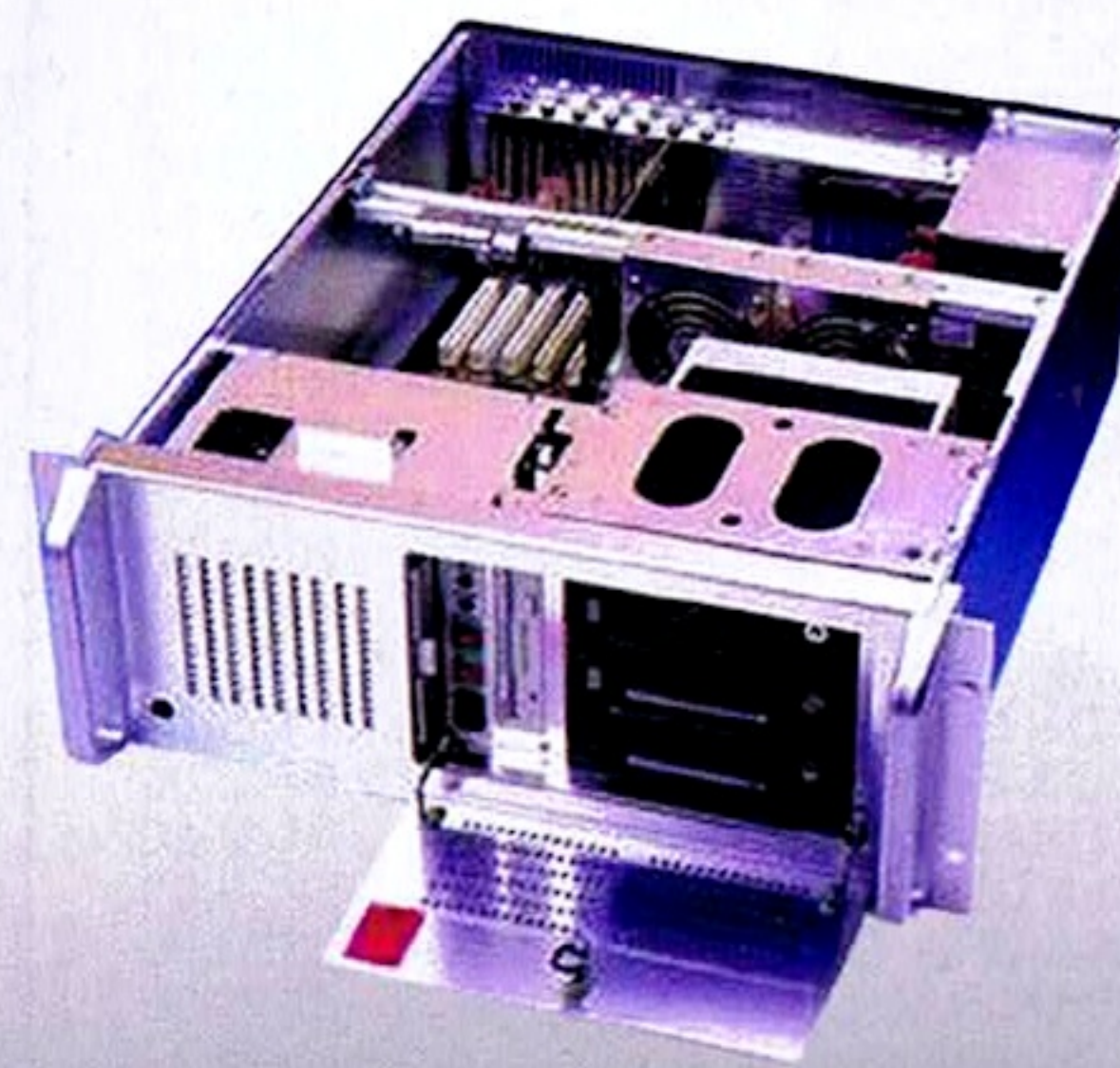
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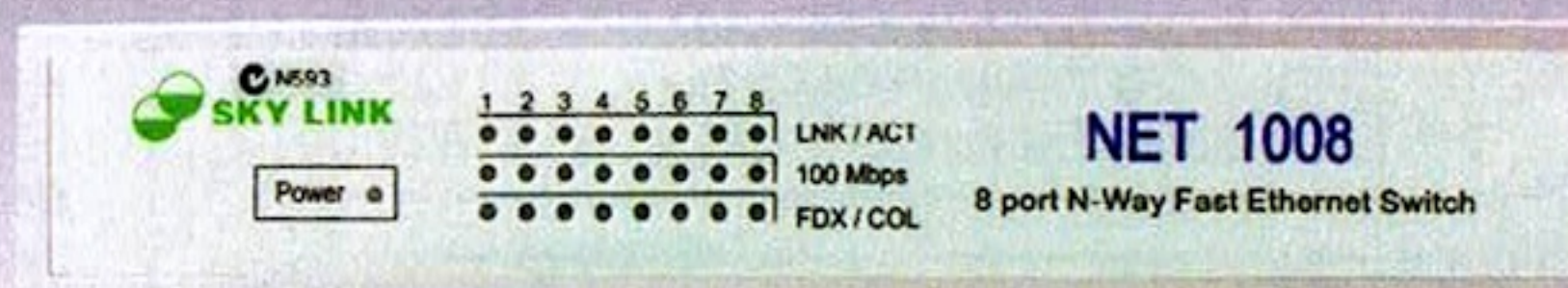
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that's because it was submitted over a
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WARNING: This ad contains **BRUTAL** honesty for all **ATOMICANS** who like to play games...
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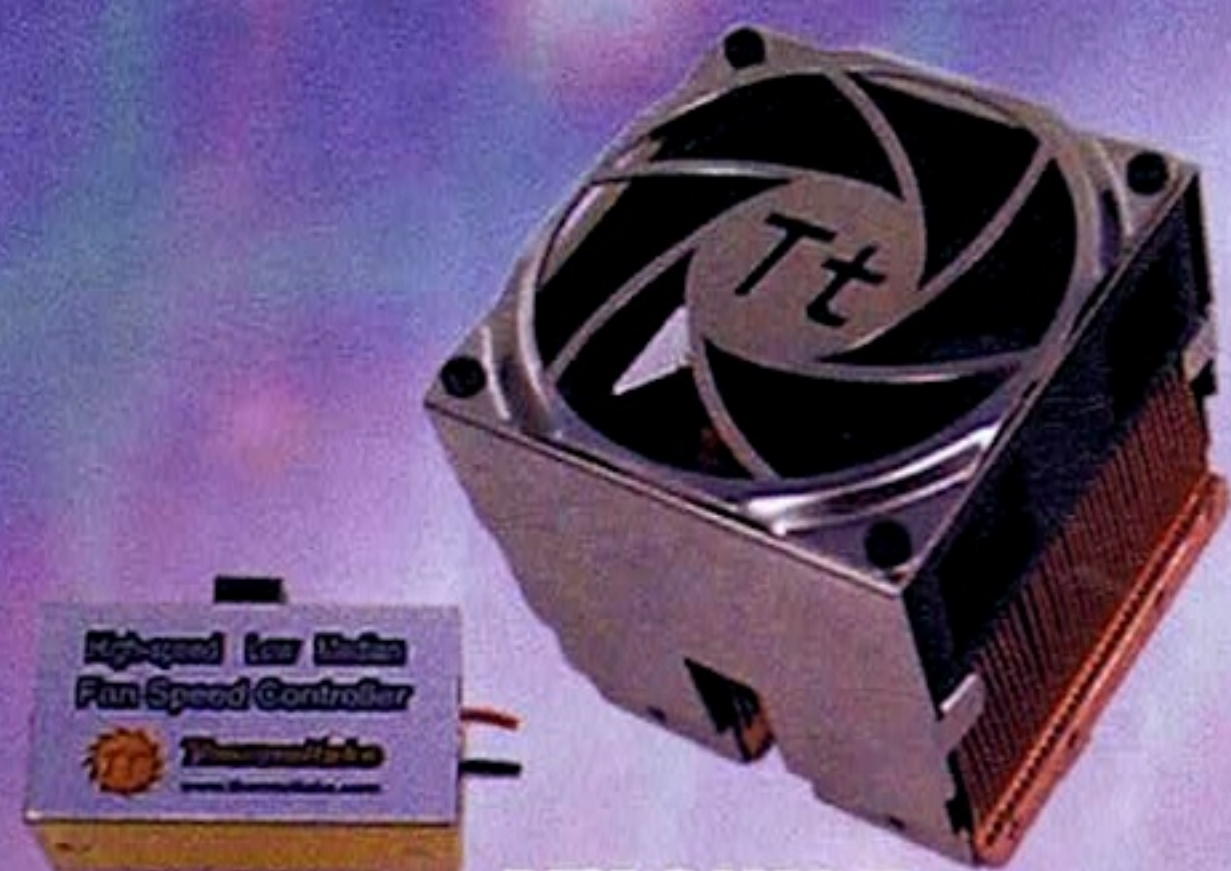
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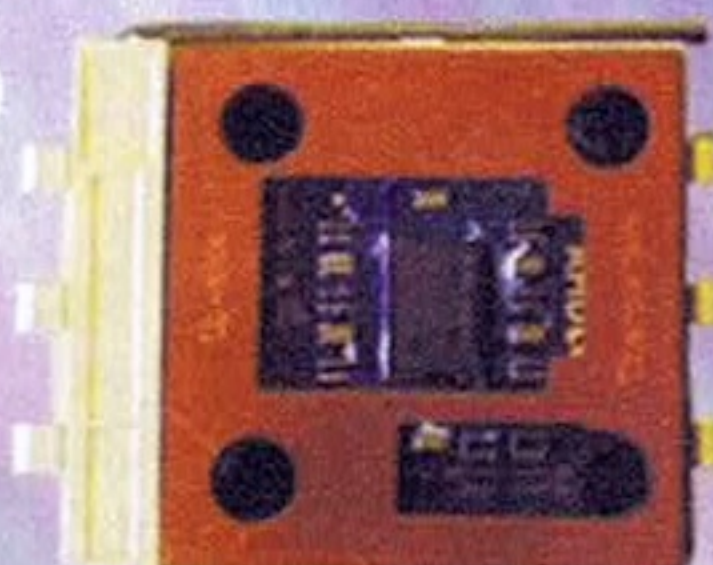


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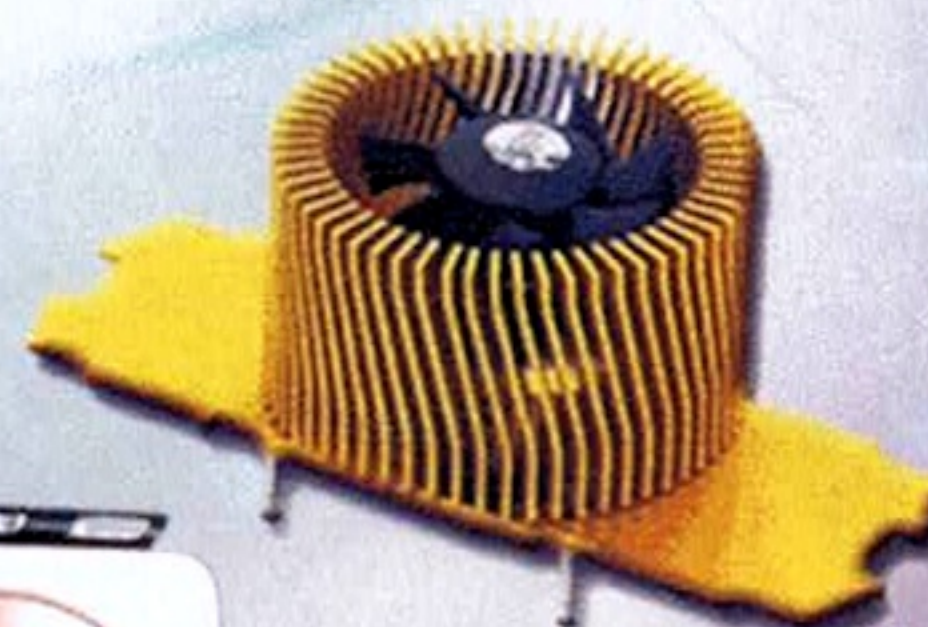
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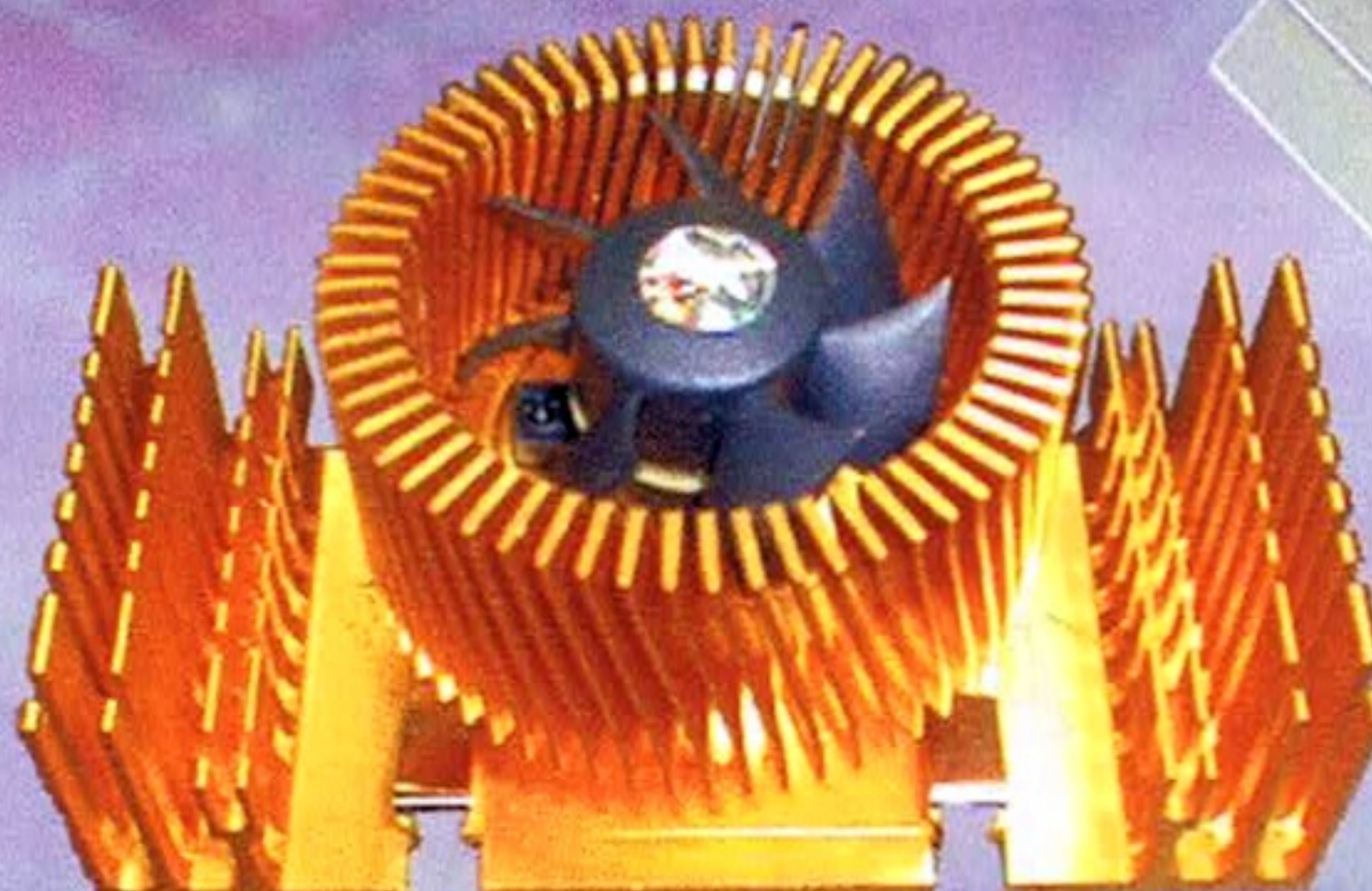
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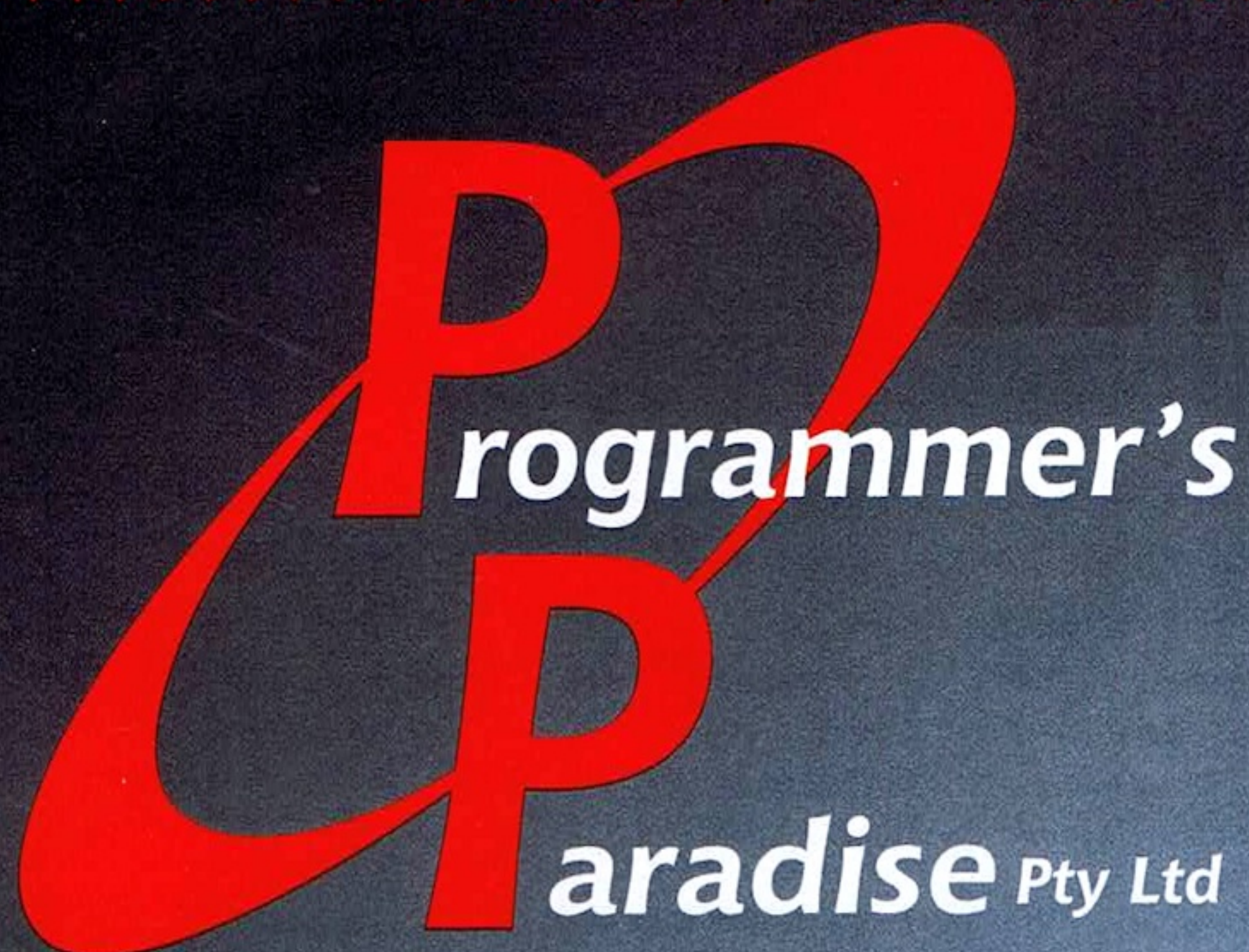
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Chemical agents

There's one thing that everyone has done at some stage but won't admit. That one thing is so common, the Government has commissioned a report to find out how often we do it, and it's so serious, companies are also paying big bucks to find out which employees do it most frequently. Hell, they're even thinking of introducing a law to try and stop it.

It's playing computer games at work.

From Solitaire to Day of Defeat, everyone at some point has used their computer for something other than grooming spreadsheets. Take a visit to an office PC recycling centre and they'll tell you the keys they replace the most are 'alt' and 'tab'. Buy an ex-office monitor and you'll see the Ace of Clubs etched into the top right-hand corner of the phosphor. Computers and games are harder to separate than a PA's lipstick on a Hugo Boss business shirt.

It's not hard to spot the office gamer: they've set up their desk with their monitor facing the wall, and getting to their chair is like running the obstacle course on Survivor. Their left hand hovers over the end of the keyboard, and their eyes dart nervously if anyone in a suit walks by. They tend to swear absently at the screen, and from time to time rock violently like they've got fleas. And they usually have their lunch sitting at their

desks, looking like a right girlie swot.

If this sounds like you, we've got some bad news. Scientists at Cambridge University have worked out a way to read your screen, just by measuring the light that bounces around the room. Using a light sensitive device called a 'photomultiplier' (note the really imaginative nomenclature), the scientists can record the light from a flickering CRT. Then, by applying a series of algorithms to the patterns, they can actually reconstruct the pixel patterns. It's join the dots, just done really quickly.

This means two things: one, your mother can now prove that the strobe lights at a dance party really do spell out satanic verses; and two, any boss armed with a photomultiplier can see exactly what's going on behind your fortress of servitude.

You'll be sitting there potting zombies in an Excel window, and your boss will know your every move. Like being the proud owner of a video store in an Amish village, life at work is destined to become deadly dull.

A lot of people are very nervous about this technology, and not just the office warriors. Crusaders of privacy argue that this technology could be used to spy on people from kilometres away, using a regular telescope. How you use your

computer could be brought back to haunt you, just by hooking one of these machines up to a digital recorder. And trying to hide your Buffy obsession from your girlfriend is going to start getting really, really tough.

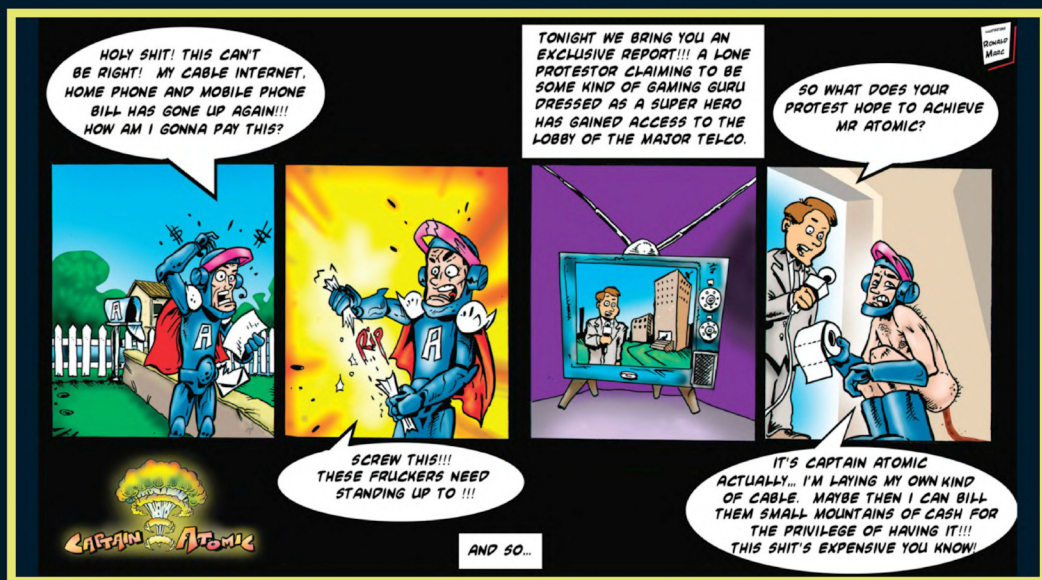
Astronomers, on the other hand, are going to have a blast. You can just imagine, one dull night in the BRT (Big Round Turret): Chief Scientist Raymond (not his real name) gets bored and reprograms the telescope to focus on a distant apartment building to scan for porn. (Well, maybe it is about time these guys get to have some fun. We sure don't know how they manage to stay up all night without shooting anything.)

Related to this 'photon-spying' is another announcement: you know the flashing LEDs on your modem? Someone has now managed to record that flashing as binary code and reconstruct the original text (get a life people!).

Now anyone signing up for anything online with a credit card is going to have to cover their monitor AND their modem. . . just to make sure they're not being recorded.

We can see it now: men in trenchcoats, flinging them open to hide their computer equipment. Ah yes... old habits do indeed die hard.

John Simpson



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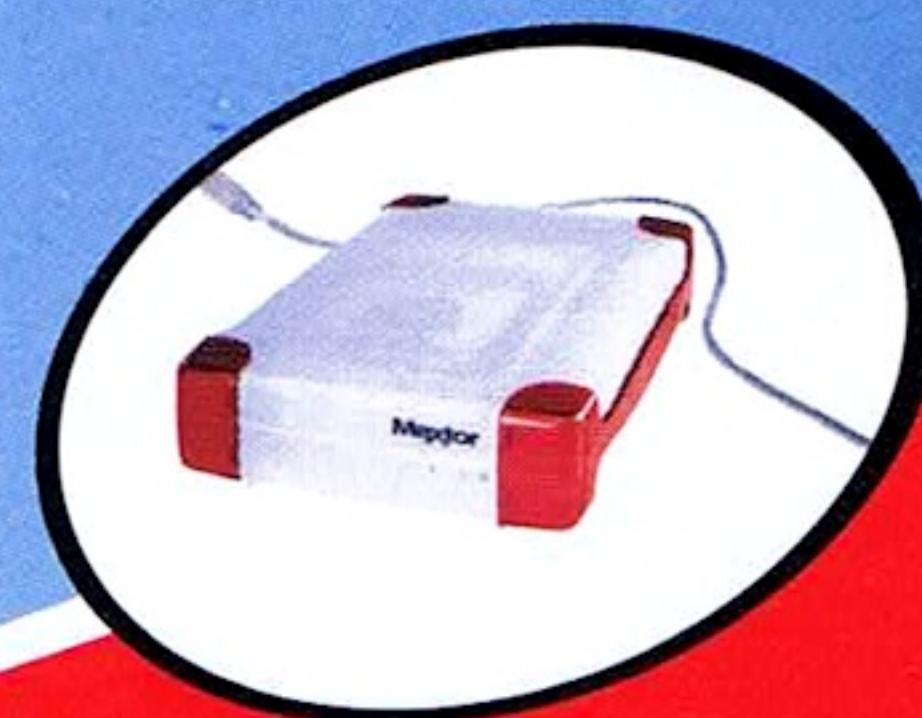
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